JPRS 74313

4 October 1979

China Report

SCIENCE AND TECHNOLOGY

No. 10

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Indexes to this report (by keyword, author, personal names, title and series) are available from Bell & Howell, Old Mansfield Road, Wooster, Ohio 44691.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. JPRS 74313	2.	3. Recipient's Accession No.
4. Title and Subtitle CHINA REPORT: SCIENCE AND TECHNOLOGY, No.10			5. Report Date 4 October 1979 6.
7. Author(s)			8. Performing Organization Rept. No.
9. Performing Organization Name and Address Joint Publications Research Service 1000 North Glebe Road Arlington, Virginia 22201			10. Project/Task/Work Unit No. 11. Contract(C) or Grant(G) No. (C) (G)
12. Sponsoring Organization Name and Address As above			13. Type of Report & Period Covered 14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

This serial report contains articles, abstracts and news items on national developments in science and technology; and physical, applied and life sciences in China.

17. Document Analysis a. Descriptors

CHINA
National Developments
Academia Sinica
Physical Sciences
Applied Sciences
Life Sciences

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group 01, 02, 04, 06, 07, 08, 09, 11, 12, 13, 20

18. Availability Statement Unlimited Availability Sold by NTIS Springfield, Virginia 22161	19. Security Class (This Report) UNCLASSIFIED	21. No. of Pages 72
	20. Security Class (This Page) UNCLASSIFIED	22. Price

JPRS 74313

4 October 1979

CHINA REPORT

SCIENCE AND TECHNOLOGY

No. 10

CONTENTS

CONTENTS (Continued) Page

ABSTRACTS

NATIONAL DEVELOPMENTS

ACADEMY OF SCIENCES CALLS WORK FORUM TO DISCUSS MEASURES TO IMPLEMENT EIGHT-CHARACTER POLICY

Beijing GUANGMING RIBAO in Chinese 7 Aug 79 p 1

[Text] Our correspondent Luo Ying [7482 3841] reports: Not long ago, the Chinese Academy of Sciences [CAS] called a work forum of its branches at Beijing to discuss measures to implement the policy of adjustments, reforms, reorganizations and raising standards, set forth by the CCP Central Committee, to integrate the specific conditions of the academy, to determine the task of adjustment and the concrete measures to put this policy into effect.

Vice Premier Fang Yi gave an important speech at the forum. He referred to the example of comprehensive utilization of scientific research at the Panzhihua mine of paragenetic minerals and set forth the following scientific research tasks of a similar comprehensive nature: The CAS must more effectively participate in work, must lay even more emphasis on pure mechanical theory, and must undertake more basic and theoretical research. He expressed the hope that work will be well coordinated, each doing that in which he excels, in order to develop production and science and make even greater contributions. Comrade Fang Yi also hoped the leading comrades in the branch institutes will engage in most intensive scientific research, grasp two or three research topics and, once undertaken, will carry them through to the end. Through practical experience and assiduous study, they shall gradually become experts. All leading cadres must establish the excellent working style of untiring eagerness for learning and for working in a thorough and down-to-earth manner in order to change the research institute effectively by their own exemplary actions.

CAS Vice President Li Chang gave a speech on the issue of fully implementing a policy of adjustments, reforms reorganizations and raising standards. CAS Secretary General Yu Wen elaborated on the task of adjusting research work. The forum also discussed Vice President Hu Keshi's talk on strengthening the ideological and political work in the scientific research units. The participants at the forum freely and without inhibition discussed what was on their minds. The meeting proceeded vividly and vigorously, reflecting an emancipation of thinking, a kind of "getting the

engine started," seeking truth on the basis of objective facts, uniting in complete solidarity with a forward-looking spirit.

All comrades participating in the forum believed the academy experienced a great restoration and development in its research work during the last 2 years under the leadership and care of the CCP Central Committee headed by Comrade Hua Guofeng. It mobilized the masses to expose and criticize the "gang of four;" eliminated the pernicious influences of Lin Biao and the "gang of four;" resolutely carried out the party's policy toward intellectuals; aroused the zeal of the broad masses of scientific and technical personnel, workers and cadres; and carried out adjustments in the contingents of scientific research workers, gradually restored and developed scientific research, production and all types of professional work. One after another, 12 branch institutes were established at Shanghai, Hefei, Nanjing, Wuhan, Guangzhou, Chengdu, Kunming, Xian, Lanzhou, Xinjiang, Shenyang and Changchun. The academy was also quite active in training qualified personnel and in the international exchange of technologies. Last year, over 1,000 scientific research achievements could be registered throughout the academy.

While the general situation is good, certain problems still exist. For instance, orientation concerning their tasks is not sufficiently clear in the various research institutes, main points of attack are not obvious and there is some overlapping in work and in some industrial departments. Many research institutes have not yet begun their research work in basic theories in earnest. Plans are on a fairly large scale and investments in large and medium-size engineering projects are fairly large, but medium and small-scale projects are fairly scattered, the battle line is excessively long and overstocking and waste are also quite serious. Tasks and conditions are disjointed, and no overall balance has been achieved. The many difficulties which the research personnel have experienced in making their livelihood have had an adverse influence on their energy. Although these are problems encountered in advancing forward, they illustrate the arduous task of adjustment, reform, reorganization and raising standards that scientific research work is facing.

The forum emphatically pointed out that the "eight character" policy is a positive one. In some sectors there may be advances as well as reverses, ups and downs, but overall there will be steady progress. Speaking of the conditions in the CAS, we must not underestimate the difficulties created by the protracted sabotage of Lin Biao and the "gang of four," but we have even less reason to underestimate the zeal of the masses of technical personnel, workers and cadres and the latent resources in the scientific research units. We must bring the revolutionary drive into full play and effectively carry out adjustments, thoroughly solve the actual problems in our work, organize the strength of the broad masses of staff and workers for scientific research production. We can have confidence that once adjustments and reorganization have been effectively completed, scientific research work will advance rapidly and develop in a well coordinated manner, providing even greater contributions for the realization of the four modernizations.

The CAS is the overall center of natural science research for the entire country. Its main task is research and development of new theories and technologies in the natural sciences and coordination of efforts to solve the major scientific and technological problems of comprehensive nature in the national economic construction, with special emphasis on fundamental questions and on raising standards. The forum pointed out that in order to better implement this policy the major tasks of adjustment in the CAS during the next 3 years will be to: 1) Adjust our policy of developing the various subjects of research, to further implement a policy of putting special emphasis on fundamental problems and on raising standards in order to serve the national economy and national defense construction. The CAS is engaged in research work on such basic subjects as mathematics, physics, chemistry, astronomy, geography, biology, etc., also mechanics and technological sciences. In these scientific areas, it is necessary to have fields of particular emphasis and to display one's particular specialty, with a division of labor, coordination and high degree of cooperation with such "front armies" as the institutions of higher learning, sectors of industrial production, defense research systems and local scientific research organizations. We must also conscientiously study to conform to the policy of developing scientific subjects appropriate to the special conditions of our country and carefully deploy our technological strength for research. Starting from the possibilities of the present situation and conditions, we must appropriately reduce our investments in certain large-scale experimental engineering projects, decelerate them, and step up down-to-earth preparatory research, preparatory manufacture and planning and experimenting activity. In mathematics, biology, chemistry, geology, theoretical physics, solid-state physics, etc., areas which, comparatively speaking, require little monetary outlay but which are very much the backbone of science and technology, we shall exert the greatest efforts and they will yield more results. We must organize well the strength that is to be expended on new technologies, strengthen basic research, be attentive to raising standards in the various branches of learning and apply a certain amount of our strength for this purpose in order to fulfill the task of making scientific research and experimental installations with the CAS complement each other into one whole. We shall make great efforts to develop new theories and technologies and, in coordination with other relevant departments, energetically solve the major problems of a comprehensive scientific and technological nature in our national economy and defense construction. We shall give prominence to the main points and strengthen our organization, particularly with regard to agriculture, energy sources, raw materials, environmental protection, space science and technology, computer technology, large-scale integrated circuits, laser and photoelectric surveying technology, as well as most advanced defense technology, striving to make greater contributions to the adjustment in the national economy and to strengthen the work toward achieving the four modernizations.

2) Adjust the scope and pace of the development of scientific research so that the development of scientific research will conform to the needs of the four modernizations as well as to the financial and material resources

of the state. Judged by the entire national economy, the scientific undertakings are a "short line". Although the allotments by the state have been increased, they are still insufficient, and the internal development is not well balanced and appropriate adjustments are necessary in the scope of scientific developments, their speed and the range of scientific subjects. Appropriate adjustments must be undertaken in the CAS in the case of scientific research which is not needed or duplicated, or is of low level and little significance. In scientific research of great importance we must further clarify strategic planning and for importantengineering projects we must equitably adjust investment planning. We must do a good job at establishing a comprehensive balance of our tasks and conditions, rigorously examine and make appropriate arrangements.

3) Adjust our plans for imports. We must firmly uphold self-reliance as our main principle, strive to use imports as a subsidiary arrangement, actively organize our strength and provide ourselves with the arms we need. At the present moment there are two things we must effectively carry out: One is to get organized and use our own strength to manufacture the equipment for scientific research; and the other is to organize cooperation for the joint use of large and costly apparatuses and equipment, bringing into full play all our latent resources. Factories under the CAS must integrate the internal needs of the CAS when carrying out the development and batch production of scientific apparatuses, equipment or their components. Every research institute shall gradually strengthen its technological setup and increase its capacity of developing scientific apparatuses. We must grasp well the work of moving out produced items and checking that material reaches a rational stock reserve and give full play to the latent material resources.

4) Adjust the scientific research organization, perfect the research setup in the various areas and strengthen the training of qualified personnel. The scientific research organization must show a rational distribution and harmonious development. Scientific research personnel who have produced achievements or made contributions must be promptly promoted; particular attention must be paid to the training of selected middle-aged and young technical personnel. We must raise leaders in the specialized fields and branches of the various sciences. The Chinese technical universities, post-graduate research institutes and the four universities must be operated at high standards.

5) Adjust the trend in investments for capital construction, strictly control newly submitted items, guarantee the quickest completion of items under construction, appropriately control the investment ratio, conscientiously shorten the battle line, and make every effort to fill up all gaps. We must effectively tap latent resources, carry out transformations, fully bringing into play the effectiveness of the available old bases and institutes. We must advance steadily in building new bases. We must give priority to improving the livelihood of the masses and gradually solve this problem.

The forum believed the research institutes must be improved by adjustments, by instituting a system of division of labor and responsibility of the institute director (factory manager, school president, etc.). We must continue to carry out effectively an adjustment of research work with the "five fixations" as the central principle. Factories are to carry out enterprise management by institutions. We must establish a normal order of research and research work and a normal order of productio-.

The present forum also discussed the tasks of the branch institutes and amended the "Temporary Regulations Governing the Structure and Tasks of CAS Branch Institutes."

It was pointed out at the forum that in the new situation the ideological political work of the party must be further strengthened and certainly not slacken. We are firmly determined to implement the spirit of the Third Plenum of the CCP Central Committee, to conclude effectively the struggle of exposing and criticizing the "gang of four," to continue to eliminate the influences of the leftist extremist line of Lin Biao and the "gang of four," to resolutely oppose factionalism, to strengthen stability and solidarity, promote democracy and guarantee the thorough implementation of the policy of adjustment, reform, reorganization and raising of standards.

8453
CSO: 4008

BRIEFS

YUNNAN OFFICIALS VISIT CAMP--The opening ceremony for the first Yunnan science and technology summer camp was held in Kunming on 6 August. This summer camp is jointly sponsored by the Yunnan Science Association, physical culture committee, education bureau, culture bureau and CYL committee. (Zhu Ying), chairman of the summer camp committee, presided over the opening ceremony which was attended by some 1,200 persons. Also present at the opening ceremony were Gao Zhiguo, (Ma Wendong), (Zhao Ziqiang), (Hao Qingying), (Huan Demao) and (Liu Yuanquan), responsible persons of the Yunnan Provincial CCP and revolutionary committees, Kunming PLA units, Yunnan military district, the Kunming Municipal CCP and revolutionary committees and other circles concerned. Gao Zhiguo gave a speech. [Kunming Yunnan Provincial Service in Mandarin 1330 GMT 7 Aug 79 HK]

QINGHAI SCIENCE FORUM--The Qinghai Provincial Scientific and Technological Commission and the Qinghai Provincial Scientific and Technological Association held a forum of scientific research personnel of Xining area on 17 July to study and discuss guidelines of the second session of the Fifth NPC. The forum discussed the question of how Qinghai's scientific research institues can better serve industrial, agricultural and livestock production during the 3-year period of adjustment of the national economy. Comrades pointed out the need for vigorously developing light and textile industries in Qinghai. It urged departments concerned to take effective measures for training a contingent of scientific and technical personnel and running training classes for the province's available scientific and technical personnel to raise their technological level. Ma Wanli, chairman of the provincial revolutionary committee, attended and spoke at the forum. [Xining Qinghai Provincial Service in Mandarin 1430 GMT 20 Aul 79 OW]

SCIENCE BOOKS--Beijing, 28 Aug--More than 1,100 editions of books on science were published throughout China in 1978. In addition to the 34 national science periodicals, over 20 provinces, municipalities and autonomous regions have also run newspapers to popularize science and technology. So far, several hundred editions of books on science have been published or will soon be published this year. [Beijing XINHUA Domestic Service in Chinese 0158 GMT 28 Aug 79 OW]

CSO: 4008

BRIEFS

CALCULATON OF SATELLITE MOTION--Tokyo 4 Aug KYODO--Astronomers at the Purple Mountain Observatory in Nanjing (Nanking) have developed a new method for calculating the motion of artificial earth satellites, the XINHUA News Agency said in a broadcast monitored here. XINHUA said that the new method, called 'second order perturbation theory with semi-analytical and semi-numerical integration" involves "simpler formulae and less computation than other methods, and also is more accurate." Either the analytical method or the numerical method has been used in the conventional calculation of satellite motion, it said. XINHUA said that the analytical method is complicated and its terms sometimes amount to tens of thousands, while the numerical methods is precise and simple but requires enormous calculations. XINHUA said that the new method gives a new theoretical base to China's development in satellite surveying and navigation. The Purple Mountain Observatory, a unit under the Chinese Academy of Sciences, is the largest observatory in China, according to the agency. [Text] [Tokyo KYODO in English no time given 4 Aug 79]

CSO: 4008

APPLIED SCIENCES

'XINHUA' NEWSLETTER VIEWS CHINA'S NEW COMPUTER CIRCUIT

Beijing XINHUA Domestic Service in Chinese 0730 GMT 7 Sep 79 OW

[Newsletter by XINHUA reporter Gu Mainan: "One Year--On Semiconductor Specialist Professor Wang Shoujue"]

[Excerpts] Beijing, 7 Sep--It began in 1977. On the evening of 24 October 1977, party and state leaders met with scientists attending the national conference on the development of the natural sciences at the great hall of the people. In the brightly lit hall, the scientists expressed their heartfelt jubilation with warm applause. The leading comrades of the party Central Committee sat down, ready to have a group picture taken with the scientists. Standing behind comrades Hua Guofeng and Deng Xiaoping was a tall, thin middle-aged man who was in high spirits. While waiting for the group picture, comrade Hua Guofeng turned his head and talked with him. Comrade Hua asked: "What is your speciality?" The middle-aged man replied: "Semiconductors." Comrade Hua asked: "How are our semiconductors?" The middle-aged man replied: "We are more than 10 years behind foreign countries." Comrade Hua asked: "Where will China stand in 10 years?" The middle-aged man replied: "China will be very close to the foreign countries." Comrade Hua asked: "When can we develop large-scale integrated circuits?" The middle-aged man replied to this question.

Comrade Deng Xiaoping attentively listened to their conversation. As the leading comrades of the party Central Committee were leaving their seats, comrade Deng Xiaoping turned his head and said something. His voice was drowned in the conversation and laughter around him. The middle-aged man did not hear clearly what comrade Deng Xiaoping said. He leaned forward and listened intently. Looking at him, comrade Deng Xiaoping repeated what he had said, using gestures. Comrade Deng Xiaoping encouraged all scientists to race against time and try to realize the four modernizations at top speed. That middle-aged man was professor Wang Shoujue, famous semiconductor specialist and researcher of the semiconductor research institute of the Chinese Academy of Sciences.

On their way from the great hall of the people to the guest house, the scientists sharing the car with professor Wang Shoujue asked him what the leading

comrades had said. With great emotion, he repeated his conversations with the leading comrades of the party Central Committee and said: To rapidly develop large-scale integrated circuits is the instruction of the party and the demand of the people.

Since the discovery of the integrated circuit in the 1960's it has developed from small-scale to medium-scale to large-scale to very large-scale, undergoing four generations of change. It has developed from the integration of several transistors and resistors to the integration of several hundred thousand to a million functional computer elements able to fit on a silicon pellet the size of a mung bean, with an area of only a few square millimeters. It is on this basis that the new frontier of science--semiconductor microelectronics--is formed. When this branch of science was first developed abroad, China was not too much behind the foreign countries. At that time Wang Shoujue was less than 40 years old. Working hard, he was confidently engaged in the study of integrated circuits. He led scientists and technicians in the research department to work under difficult conditions and succeeded in the study of silicon planar technology by making China's first planar silicon transistor, thus laying the foundation for the development of integrated circuits. After successfully making five types of planar transistors, they succeeded in making China's first integrated circuit and won a first-class invention award from the state scientific and technological commission.

However, when Lin Biao and the "gang of four" held sway, all this became the "evidence of their crimes" and the manifestation of their efforts to follow the "road to become specialists without a socialist conscience." Wang Shoujue was forced to leave the laboratory and was confined to a small room to write a self-examination.

One day, researcher Lin Yu came to get something in the room, and found Wang Shoujue concentrating on drawing something on the table. After asking Wang Shoujue what he was doing, Lin Yu realized that Wang was designing a computer. Lin Yu was greatly moved. He thought: Even in that kind of situation, Wang Shoujue could not forget about science. With tears in his eyes, Lin Yu asked: "Do you think that the computer you are designing will be useful?" Wang Shoujue replied with confidence: "It will be useful one of these days." That day has finally arrived.

On the day when the "gang of four" was overthrown, Wang Shoujue and his brother Wang Shouwu, also a famous semiconductor specialist, were chatting. Wang Shoujue mentioned the fact that he wanted to design a new circuit to replace commonly used computer circuits. He said: "All the integrated circuits presently used in computers are switching circuits. To complete a logic function, it is necessary to go through many switchings. This inevitably makes the circuits complicated and affects the speed of operation." Wang Shoujue said: "Yes, structure and speed are determined by the basic element of electronic computers--and not gate circuits." Wang Shoujue said: "Can I change the circuits and look into the possibility of developing a linear-type logic circuit

so that logic functions can be accomplished through linear logic circuits instead of 'on-off switching?'" He went on with great enthusiasm: "I am thinking about developing a new high-speed integrated logic circuit with a kind of 'linear and-or gate' as the principal logic element. I have conducted theoretical analysis, checked all kinds of parameters, and carried out physics experiments on parts. My preliminary data show that the use of this multi-variate logic circuit as the basic element in computers will lower the cost of computers and raise the speed of computer operations. It will also simplify the procedure for manufacturing computers. Once the circuit is proven sound and used in mass production, electronic computers will be used in many factories, schools and laboratories."

Encouraging his brother, Wang Shouwu said: "It is a good idea, go ahead and give it a try."

Wang Shoujue's work on the new circuit won support from Professor Huang Kun, director of the above-mentioned institute. After that, he and the comrades in the research department worked day and night. On the basis of his design, they put more than 100 four-digit full adders on a silicon pellet with an area of one and a half square inches. Later, they carried out experiments using this new circuit to develop large-scale integration. As a result, they integrated more than 100 'linear on-or gates' on a silicon pellet only four square millimeters in area. The intensity of integration in the new circuit is several times higher than that of the logic circuits in common use. Experiments show that it takes only one nanosecond to transfer a bit of information with the new logic circuit, while it takes as long as 3 to 3 nanoseconds to transfer a bit of information with an ordinary circuit. That is to say, if such a circuit is used in electronic computers, the speed of operation will be much faster. The results of the experiments also show that complex silicon epitaxial technology is no longer a necessity in manufacturing this kind of 'linear and-or gates,' because the basic element in this new circuit is only a specially designed multi-emitter transistor.

In December 1978, slightly over a year after comrade Deng Xiaoping stressed the need to quicken the pace in studying and developing large-scale integrated circuits, Wang Shoujue and others published a thesis in China's ELECTRONICS JOURNAL and made public all the data from their experiments on the new circuit. After its publication, the thesis attracted the attention of all professionals in the field of semiconductors, at home and abroad. Some scientists abroad held that it could be an important invention and a major innovation for the most fundamental element in electronic computers. In order to further prove the practicality of this new circuit, Wang Shoujue and others are applying this new circuit in building an electronic computer capable of making 500,000 computations per second. An initial test run indicates that the arithmetic unit and controller of the computer have functioned well.

CSO: 4008

APPLIED SCIENCES

BRIEFS

LIAONING SOLAR ENERGY--Scientific workers in Liaoning Province have achieved some results in harnessing solar energy. There are now more than 30 solar hot-water heaters in the province, capable of producing 150-200 tons of hot water daily. [Shenyang Liaoning Provincial Service in Mandarin 2200 GMT 19 Aug 79 SK]

TIANJIN NATIONAL ENGINEERING SEMINAR--The 12-day national engineering, technology and scientific dialectics seminar closed in Tianjin on 16 August. Some 1,600 representatives from 28 provinces, municipalities and autonomous regions throughout the country attended the closing ceremony. During the seminar, 15 experts, professors and science workers made academic reports. They discussed how to apply materialist dialectics to survey the practical problems in engineering, technology and science. [Tianjin City Service in Mandarin 0030 GMT 17 Aug 79 HK]

CSO: 4008

'RENMIN RIBAO' REPORTS NEW ADVANCES IN TRADITIONAL MEDICINE

Beijing XINHUA in English 0734 GMT 5 Sep 79 OW

[Text] Beijing, 5 Sep (XINHUA)--Today's PEOPLE'S DAILY reports new advances in traditional Chinese medicine.

Among the new books off the press are "A Collection of Clinical Experience of Zhao Bingnan (a noted dermatologist)", "Liu Fengwu's Experience in Gynaecology" and "Selection of the Medical Experience of Guan Yubo (an Expert in Hepatitis)." This is the result of four years of work by 40 experts. Books on surgery and pediatrics are to come off the press soon.

Work of this sort was started in 1959 with the support or Premier Zhou Enlai and Chairman Mao. It was interrupted by the cultural revolution when many academic records were lost and some of the experts persecuted badly.

In 1975, the work was renewed at the bidding of Premier Zhou. Three million words of summaries of clinical case histories by 40 experts in various branches of traditional Chinese medicine were compiled.

Following a recent document from the party Central Committee on applying the skill and experience of the experts, the Beijing health department mapped out work plans. Thirty-nine experts were chosen to take on apprentices or assistants for clinical practice, especially their particular skills in treating certain diseases. Two or three well-trained young people were assigned to each of them and those who learn will will get promotions and wage increases ahead of the regular schedule.

CSO: 4020

LIFE SCIENCES

'RENMIN RIBAO' ARTICLE ON IMPORTANCE OF CHINESE MEDICINE

Beijing XINHUA in English 0739 GMT 5 Sep 79 OW

[XINHUA headline: "Chinese Medicine and Pharmacology--A Magnificent Treasure House"]

[Text] Beijing, 4 Sep (XINHUA)--Chinese medicine, the crystallization of the Chinese people's struggle against disease for many many centuries, is the most integrally preserved of China's ancient culture, says a signed article in today's PEOPLE'S DAILY.

Extant books on Chinese medicine and pharmacology written since China has had written history number 8,000 kinds in over 100,000 copies says Zhang Honggui in the article. These plus large numbers of historically preserved material on medicine and prescriptions used among traditional Chinese doctors and among the people make the content exceptionally rich and unsurpassed in the world.

An abundance of clinical experience coupled with systematic theory, Chinese medicine and pharmacology has served the people of China from one generation to the next. More than that, it has also contributed to the health protection of the people of the world.

As far back as the Chin dynasty (221-207 B.C.), Chinese medicine found its way first of all to Korea, Japan, Vietnam, Arabia and India, and later, to Europe and America. A number of classical writings on Chinese medicine and pharmacology has been translated into English, French, German, Korean, Japanese and Arabic.

The treatment of smallpox by inoculation with human smallpox scabs was invented in China in the 11th century A.D. It was introduced into Europe in the 17th century and then a British doctor invented inoculation with scabs from cattle.

Due to the limited horizon during the period of history, Chinese medicine did not benefit from modern science and technology, thus its knowledge of diseases has been limted to the macroscropic view.

Since China's liberation, persistent efforts have been made to combine Chinese and Western medicine so that each could benefit from the other's good points. Achievements have been scored in such integration in treating fractures with splints, acute abdominal conditions, gall stones, cardiovascular diseases, cataracts, chronic bronchitis, children's pneumonia, piles and fistules and other common diseases and the use of acupuncture anaesthesia.

Chinese medicine and pharmacology are being studied in a number of foreign countries. More Chinese classics on these subjects are being translated. More students are being sent to China to study Chinese medicine and the demand for the export of Chinese medicine has been growing.

The author points out that Chinese medicine has these features: In theory it stresses the integrity of the body and its processes, internal causes and the unity between man and his environment and the contradictions within the human constitution. In diagnosis it stresses the combination of looking, smelling, asking and pulsing. In therapy it stresses the analysis of particular cases to discover the common point in differing things and to find the differences in things held in common, giving treatment in accordance with the particularity of the patient, the time and circumstance and aiming at resolving the root cause.

The author says the first Chinese book on medicine appeared during the spring and autumn period (770-476 B.C.). The first Chinese book on pharmacology was published during the Eastern Han dynasty (25-220 A.D.). It already included 365 kinds of herbal and other medicine.

CSO: 4020

BRIEFS

BEIJING BAREFOOT DOCTORS--Beijing, 26 Aug--Nearly 10,000 barefoot doctors from Beijing's 14 rural counties and suburban districts recently took part in an examination given by the city's bureau of public health to check on their professional ability. Eighty-three percent of the candidates passed the examination and will be granted licences to practise medicine. The examination emphasized basic medical knowledge and the treatment of common diseases and included the application of traditional Chinese and Western medicine, basic skills in laboratory tests, the diagnosis of contagious and acute abdominal diseases, the prevention and cure of infantile rickets and basic knowledge about environmental hygiene. This examination was one of the steps that are being taken to raise the professional level of barefoot doctors in the countryside. The public health bureau issued syllabuses and materials to help candidates prepare for the examination. Those who failed will receive further training and have another chance in February or March next year along with other barefoot doctors who were unable to take part this time. There is now one barefoot doctor for every 290 peasants in Beijing's rural areas, and each production brigade has three to four barefoot doctors. They play an increasingly important role in the country's three-level rural medical network, which works at county, commune, and production brigade levels. [Beijing XINHUA in English 0703 GMT 26 Aug 79 OW]

TIBETAN MEDICAL TEXT--Xining, 7 Aug--A medical text, "Standards for Tibetan Drugs," has been published in the Tibetan language by the Qinghai minority publishing house. It is hoped that this work will end confusion over the use and nomenclature of some medicines that has existed for many years. The book is approximately 300,000 words in length, and details the sources, shape, taste and features of 174 specimens, and preparations, usage and dosage for 290 prescriptions. The text was compiled by a group of medical researchers from Xizang, Sichuan, Qinghai, Yunnan, Gansu and Xinjiang, where Tibetan medicine is used. They have tested 1,200 drugs and 700 prescriptions since 1976. Tibetan medicine and pharmacology, with its unique theory and characteristics, constitutes an important branch of traditional Chinese medicine and pharmacology. It represents the accumulated knowledge of centuries of struggle against disease, and research in the field continues.

A dozen books have been written on this branch of medicine since liberation, including "An Outline of the Theory of Tibetan Medicine" and "Compendium of Tibetan Medicine." [Text] [Beijing XINHUA in English 0717 GMT 7 Aug 79 OW]

CORNEA TRANSPLANT--Guangzhou, 14 Aug--The ophthalmology hospital of Zhongshan Medical College in Guangzhou has successfully performed cornea transplant surgery. According to the hospital's investigation of 100 cases of this eye surgery in 1978, 70 percent resulted in restored transparency and 43 percent in restored visual acuity. Of 131 cases of serpiginous corneal ulcers operated on in 1976, 51 percent were cured by cornea transplantation in a single operation and of 40 cases in 1978, 85 percent were cured by such transplant in one operation. In the later stage of herpetic viral keratitis, the cornea is often perforated and the patient becomes blind, because the disease cannot be radically cured by anti-virus drugs. Surgeons of the hospital have performed cornea transplantation to cure many such patients. Of the 83 cases of penetrating cornea transplantation, 78 percent of them achieved transparency. Professor Du Nianzu, head of the ophthalmology department of the hospital, attended the 83d session of the Society of Japanese Ophthalmologists in Japan last march and delivered a report on "laminar cornea transplantation for treatment of serpiginous corneal ulcer," which was favourably received. [Beijing XINHUA in English 0705 GMT 14 Aug 79 OW]

HEILONGJIANG ACADEMIC MEETING--The 1979 academic meeting on tuberculosis prevention and treatment was recently held in Harbin, Heilongjiang, under the sponsorship of the Heilongjiang and Harbin chapters of the Chinese Tuberculosis Prevention Association. Over 200 medical workers attended. (Kan Duanqing), vice president and secretary general of the Chinese Tuberculosis Prevention Association and director of the Beijing Tuberculosis Prevention Center, gave a special report at the meeting. A total of 74 articles on tuberculosis prevention were read at the meeting. The meeting maintained that is is necessary to quickly improve work on tuberculosis prevention, change the backward situation, and strive to control and eradicate tuberculosis by the end of this century. [Harbin Heilongjiang Provincial Service in Mandarin 1100 GMT 26 Aug 79 OW]

PAVLOVIAN THEORY REEVALUATED--Beijing, 4 Aug KYODO--China has reevaluated the Pavlovian psychological theory, shut out from Chinese university education during the cultural revolution years, and decided to include the theory into psychological teaching curriculum. According to a XINHUA news report Saturday, this was decided at a meeting of Chinese teachers on psychology, held in Shanghai recently. The teachers concluded that the Pavlovian theory on nerve activity is still valuable as a teaching material in university education, though it has a historical limit, the report said. In the 1950's the theory of the Russian Nobel Prize-winning Doctor Ivan P. Pavlov (1849-1936) was widely introduced in China. But it was discarded as an ideological concept by China during the cultural revolution. Saturday's XINHUA report called Pavlov "a great Russian psysiologist and psychologist." [Text] [Beijing KYODO in English no time given 4 Aug 79]

NATIONAL IMMUNIZATION CONFERENCE--In order to propagate planned immunization throughout China within 3 years and to control and exterminate diptheria, polio and measles, the public health ministry recently held a national conference on planned immunization in Harbin, Heilongjiang. The conference summed up and exchanged experiences in this work, made readjustments in vaccine production and laid down the plan for vaccine supply in 1980. At present, 80 percent of the counties and districts in Beijing, Shanghai, Tianjin, Guangxi, Shaanxi and Hebei are administering planned vaccination with marked results. [Beijing Domestic Service in Mandarin 1200 GMT 3 Sep 79 OW]

XINJIANG PATHOLOGICAL MEETING--The first Xinjiang regional pathological academic meeting was recently held in Hami to hear eight special reports on pathological study and to discuss a pathological research project for the next 3 years. During the meeting, 85 essays on pathology were read, and a pathological society was elected and organized. Xinjiang now has 57 pathological research units stationed in universities, and PLA units. [Urumqi Xinjiang Regional Service in Mandarin 1300 GMT 28 Jul 79 OW]

CSO: 4008

AUTHORS: WANG Li-sheng [3769 4539 3932]
SUN Mou-qing [1327 5399 1987]

ORG: None

TITLE: "A Person Dedicated to Aircraft Maintenance"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 8, Aug 79 p 2

ABSTRACT: Xia Beihao [1115 0554 3185] is a member of the Chinese Air Force who devoted his whole career to aircraft maintenance. He was from a very poor family and had little formal education. Since he joined the Air Force in 1958, he spent all his energy teaching himself every aspect of aircraft maintenance; in addition, he also studied such books as "Theory of Flight", "Theory of Aircraft Engines", etc. to improve his theoretical background. In 1964, he was awarded the honorable title of "Master Mechanic" by the Air Force Party Committee, and one of the methods of aircraft maintenance he developed was named the "Inspection Procedure of Xia bei-hao".

AUTHOR: CHEN Shi-ping [7115 4258 1627]

ORG: None

TITLE: "The Fourth Athlectic Meet of the People's Liberation Army"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 8, Aug 79 p 3

ABSTRACT: The fourth athletic meet of the Chinese People's Liberation Army commenced on May 13 at a military base near south Beijing. The opening ceremony was attended by Chairman Hua, Vice Chairman Deng, and other officials from the Central Party Committee. The ceremony was followed by a series of parachute jumping events, target shooting demonstration by a tank unit, and riding exhibit by 24 members of a motor-cycle unit.

AUTHOR: QIAN Yong-nian [6929 3057 1628]

ORG: None

TITLE: "The Evolution and Classification of Passenger Airplanes"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 8, Aug 79 pp 4-6

ABSTRACT: Passenger airplane has undergone major evolution since the 1920's. Over the past few decades, the cruising speed of passenger airplanes has increased from 200 km/hr to over 980 km/hr; the take-off weight has increased from 12 tons to 350 tons; and the size has increased by approximately a factor of two. The classification of passenger airplanes is based on speed, type of propulsion, take-off weight, and range. On the basis of speed, there are low speed passenger planes, subsonic passenger planes, and supersonic passenger planes. On the basis of propulsion, passenger planes are divided into piston-props, turbo-props, and turbo-jets. On the basis of take-off weight, they are divided into large (100-350 tons), medium (45-95 tons), and small (less than 45 tons) passenger airplanes. On the basis of range, they are divided into inter-continental airplanes (8500-12000 km), long-range airplanes (5000-8000 km), medium-range airplanes (3000-4500 km), and short-range airplanes (less than 2500 km).

AUTHOR: QIAN Xing-yi [6929 2502 0001]

ORG: None

TITLE: "The Impact of Aerospace Technology"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 8, Aug 79 pp 7-10

ABSTRACT: The rapid development in aerospace technology over the past two decades has opened a new horizon for mankind in many industrial, agricultural, and scientific activities. Specifically, it provides a new vantage point for observing the earth and the universe; it has extended the eange and sensitivity of our perception; it provides a means for close-range observation of other planets in the solar system; it has laid the foundation for establishing a global satellite communication network; it provides a means for monitoring and predicting the geophysical environment; it has initiated revolutionary changes in navigation techniques; it allows detailed global survey of natural resources; and it has created the possibility of constructing production facilities in space.

AUTHOR: CHENG Wen [2052 2429]

ORG: None

TITLE: "Airplane With Variable-Sweep Wings"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 8, Aug 79 pp 14-15

ABSTRACT: The concept of variable-sweep wing was originally conceived from the observation that birds' wings change shape during flight. Aerodynamically, a variable-sweep wing has the advantage of being able to change its aspect ratio to achieve optimum performance in both low speed and high speed flight. The first variable-sweep wing airplane was the U.S. F-111 fighter bomber developed in 1967. Since that time, the varaible-sweep design has been used on a number of different types of airplanes: heavy fighter bombers such as the U.S. F-111 and the Soviet SU-19; long-range interceptors such as the MIG-23S; and strategic bombers such as the U.S. B-1 and the Soviet "Back Fire". On future designs, the variable sweep will be controlled electronically by an onboard computer to achieve optimum performance at any flight Mach number.

AUTHOR: YUAN Hang [6678 5300]

ORG: None

TITLE: "Air Command, Control, and Communication System"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 8, Aug 79 p 16

ABSTRACT: The pictorial diagram in Insert 2 of this issue illustrates how a modern command, control, and communication system functions during a hypothetical military engagement. The system is made up of the following components: the command center, which controls the operation of each unit in the system; a radar network whose function is to search, detect, and track enemy targets; a computer center which processes the radar information; a fleet of tactical missiles carried by trucks or submarines; and a communication network which consists of navigation satellites, reconnaissance satellites and airplanes, and communication satellites.

AUTHOR: GUO Hao-zhou [6753 3185 3166]

ORG: None

TITLE: "Two High Tension Hook Release Mechanisms"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 8 Aug 79 p 17

ABSTRACT: This article introduces two high tension hook release mechanisms used for towing model gliders. It is pointed out that using these mechanisms can increase the release height of model gliders by 10 meters and extend the total flight time by 30 seconds. The mechanical principle of the high tension hook release mechanisms is explained and the technique for towing the model glider to achieve best results is discussed.

AUTHOR: DING Li-ming [0002 4539 6900]

ORG: None

TITLE: "Structural Materials for Aircraft Turbo Engines"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 8, Aug 79 pp 18-19

ABSTRACT: In order to meet the requirements of large thrust-to-weight ratio, high compression ratio, and high temperature conditions of a modern turbo engine, many new structural materials are being developed. For example, titanium alloys, high temperature alloys and composite materials such as carbon fibre compounds and boron fibre compounds are used in making compressor blades. Cast high temperature alloys, niobium-based alloys, nickel-based alloys with tungsten fibres, molybdenum fibres, or niobium fibres, and heat-resistant ceramic materials are being developed for various turbine parts.

AUTHOR: AN Chu [1344 0443]

ORG: None

TITLE: "Discussion of an Air Defense Battle"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 8, Aug 79 pp 20-21 and 16

ABSTRACT: Electronic warfare plays an important role in modern air defense battles. During the 1973 Middle East War, electronic interference devices and electronic counter measures were used extensively as Egyptian ground units defended against Israeli air attacks with Soviet-made surface-toair missiles. Current developments in electronic counter measures are concentrated in the following areas: 1) extending the operating frequencies; 2) improving receiver sensitivity; 3) increasing the transmitting power of jamming devices; 4) using mini-computers and microprocessors to achieve electronic systems which are automatic, digitalized, and adaptive; and 5) using computers to deploy passive electronic interference devices. At the same time, significant efforts are also being made to improve the interference rejection capability of modern surface-to-air missile systems.

AUTHOR: JUN Sheng [7486 5116]

ORG: None

TITLE: "Various Types of Simulators"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 8, Aug 79 pp 22-23

ABSTRACT: Simulation techniques and simulators are increasingly being used in traffic control, space travel, and military applications. In this article, the following types of simulators are introduced: 1) a compact flight simulator unit which can be housed in a trailer truck; 2) an air combat simulator for training military pilots; 3) a simulator which uses a simple pin-hole optical device to simulate scenes in space; 4) an airplane crash simulator; 5) a tank simulator; 6) traffic simulators which are used in driver training schools; and 7) panoramic view vehicle motion simulator.

AUTHOR: None

ORG: None

TITLE: "News in Aeronautics"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 8, Aug 79 p 25

ABSTRACT: Three news items are reported in this article: 1) the opening of the fourth national parachute jumping competition on September 5 in Beijing; the competition was participated by 130 men and women athletes from 12 different provinces and cities and the People's Liberation Army; 2) the publication of a new book "The 1978 National Model Airplane Competition" by the Shanghai Educational Publishing House; 3) the World Indoor Model Airplane Championship held in England from August 27 to 28, 1978; the competition was participated by 40 athletes from 14 different countries; the team championship was won by Great Britain, with the United States second, and Canada third.

AUTHOR: None

ORG: None

TITLE: "Solar Energy Stirling Engine-Generator"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 8, Aug 79 pp 28-29 and 10

ABSTRACT: The Stirling engine is an external combustion engine invented by Robert Stirling in 1816. It differs from a conventional engine in that external heat exchangers are used to transfer heat energy to and from the working medium; the heat energy is then converted into mechanical energy through expansion of the working medium. In this article, the basic principle of a Stirling engine-generator which uses solar energy as the power source is discussed. Specifically, the operation of a free-piston Stirling engine which drives a reciprocating type generator is explained in detail. The current status in developing an efficient solar energy collection system is also discussed. In conclusion, the main advantages of a Stirling engine-generator are summarized, which include: high thermal efficiency, low noise level, low pollution level, and simple construction.

AUTHOR: None

ORG: None

TITLE: "An Experimental Parachute-Airplane Designed by the Beijing Aeronautical Institute"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 8, Aug 79 p 31

ABSTRACT: The "Wasp-1" parachute-airplane designed by the Beijing Aeronautical Institute was successfully test flown on June 6 at an airport near Beijing. A parachute-airplane is one whose rigid wings are replaced by a flexible parachute. It can be flown either by a pilot or by radio remote control. The important technical specifications of the "Wasp-1" are as follows: parachute span--8.2 m; parachute surface area--24 sq. m; vehicle length--4.25 m; total length--5.45 m; height--3.3 m; propulsion--Red-II piston engine (15 hp); maximum speed--55 km/hr; minimum speed--25 km/hr; empty take-off weight--100 kg.

AUTHOR: None

ORG: None

TITLE: "Questions and Answers for Students Interested in Aeronautics"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 8, Aug 79 p 31

ABSTRACT: In response to an inquiry by a high school student wishing to enter one of the nation's aeronautical institutes, this article describes the special curricula available at the major aeronautical institutes in China. These specializations include: aircraft design, aircrsft engines, aeronautical engineering mechanics, aeronautical radio engineering, material science and engineering, automatic control in aeronautics, electronic computer science and engineering, and aeronautical manufacturing and production automation.

AUTHOR: CHEN Ying-ming [7115 2019 2494]

ORG: None

TITLE: "Working Diagram of an Airplane Model"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 8, Aug 79 p 32

ABSTRACT: In this article, the author presents the working diagrams for constructing scale models of two "antique airplanes": the "Zhung-Dao ki 27" model 97 fighter airplane and the "Li-quan ki 55" model 99 advanced training airplane. Specifically, he suggests the construction materials, the assembly procedure, and the colors for each part of the two airplanes.

AUTHOR: None

ORG: None

TITLE: "Pictorial Illustrations"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 8, Aug 79 front cover, inside front cover, inside back cover, back cover, and inserts

ABSTRACT: The front cover of this issue shows a member of the Chinese Air Force assigned to protect the southern border of China. The inside front cover shows photographs of a "model mechanic" of the Chinese Air Force, Xia bei-hao, and members of a parachute jumping team who recently broke the national record in precision jumps. The inside back cover shows the photographs of a man-powered airplane which was successfully flown by an American Bryan Allen across the English Channel, and pictures of an experimental parachute-airplane designed by the Beijing Aeronautical Institute. The back cover shows photographs and diagrams of the DC-10 airplane which crashed when taking off from the Chicago O'hara airport on May 25. Insert 1 shows the pictures of several military airplanes with variable-sweep wings. Insert 2 shows the schematic diagram of an air command and control system. Insert 3

Continuation of Beijing HANGKONG ZHISHI No 8, Aug 79 front cover, inside front cover, inside back cover, back cover, and inserts

shows pictures which illustrate the evolution and classification of passenger airplanes.

3012
CSO: 4009

AUTHOR: SHEN Changjiang [3088 7022 3068]
DONG Wenlang [5576 2429 2597]

ORG: None

TITLE: "On the Natural Conditions for Developing Animal Husbandry in China"

SOURCE: Beijing DILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 5, May 79 pp 1-2

ABSTRACT: Natural conditions for the development of animal husbandry may be divided into the two general categories of nonbiological factors or the inorganic environment, including factors of light, heat, air, water, soil, and minerals, and the biological factor or organic environment, including plants, animals, insects, and microbes. The above factors also have direct or indirect promoting or controlling relationship with various species of domestic animals. In view of the two categories, the paper discusses the latitudinal, longitudinal, and geographic location, the elevation and topography, climate and hydrology, soil, vegetative cover, and natural grassland of China. Some regional species of domestic animals particularly suited to each special region are briefly mentioned also.

AUTHOR: YANG Qixiu [2799 0796 0208]

ORG: None

TITLE: "Vegetative Cover of Western Sichuan"

SOURCE: Beijing DILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 5, May 79 3-4, inside front cover

ABSTRACT: The southwest-northeast orientation of the major mountain ranges of Sichuan naturally divides the province into the two parts of the east and the west. The eastern part is the famous Sichuan basin, while the western part is the eastern boundary region of Qinghai-Xizang Plateau, amounting to 38.4 percent of the province in area. It has a population of four million six hundred thousand, of Zang [Tibetan], Han, Yi, and Qiang nationalities. The Hengduan mountains further divide Western Sichuan into the south and the southwestern parts. The cactus, the needle-leaved coniferous trees, the rhododendrons, the grasslands, and the alpine shrubs of both parts of the region are briefly described with a brief account of their geographical background.

AUTHOR: BI Fuchen [3968 4395 5256]

ORG: None

TITLE: "Highways of Taiwan"

SOURCE: Beijing DILI ZHIXHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 5, May 79 pp 5-6, 9

ABSTRACT: This paper is billed as "A Page on Taiwan" in the journal. The highway development in Taiwan is traced back to the year 1874 of the later part of the Qing Dynasty, when the three sections of the south, north, and central highways, totaling 485 km began to be built. These formed the foundation on which the later roads were added, the paper maintains. During the period of the Japanese occupation, a total of more than 17,000 km of highways were constructed, but only a small portion of these were asphalt or concrete surfaced. Some high speed highways were built in the thirty years since 1949. With a map of the island, depicting the high speed, major, and county grade roads, the paper reviews the history of highway development as well as the general condition of roads in Taiwan, as well as the number of buses, trucks, and private automobiles on the island. There is also a photo depicting the dangerous curves of the main east-west highway in the vicinity of Loshao in Taiwan.

AUTHOR: CHEN Shangkui [7115 1424 1145]
YANG Xiuwei [2799 4423 0251]

ORG: None

TITLE: "The Great Enterprise of Reconstructing Nature: Looking Forward to the Engineering Project of Transferring Southern Water to the North"

SOURCE: Beijing DILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 6, Jun 79 pp 1-2

ABSTRACT: The Yangzi and the Huanghe both originate from the Qingzang Plateau to flow, parallel to one another, to the eastern sea, but due to their different geographical locations, they are affected by the climatic conditions. In water volume, they are as different as night and day. For more than a millenarian, people in the north have been longing for the rich water resources of the south. It was in 1952, the line where the upper reaches of the Yangzi flow into the source of Huanghe was surveyed, but the actual planning for the project of transferring the water of the south northward did not begin until 1973. Under current design, the transfer is to be made in three lines of the west, the central, and the east. The concrete plans of this project are described. There is a map depicting the three lines. Many problems, including the effect on the quality of water of the Yangzi, the schistosomiasis host snails, possibility of secondary salinization, etc. remain to be studied before the project can actually be implemented, however.

AUTHOR: LI Jiansheng [2621 1696 3932]
CHEN Shijian [7115 0670 1017]

ORG: None

TITLE: "The Extensive and Expansive South Sea"

SOURCE: Beijing DILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 6, Jun 79 pp 5-6, 11

ABSTRACT: The South Sea, which is also called South China Sea, measures 3,600,000 km^2, three times the total area of Bohai, Huanghai, and Donghai together. The geographic, topographic, and climatic conditions of South China Sea, as well as its rich marine resources are described. There is also a map depicting the topography of the ocean floor.

AUTHOR: HE Qing [0149 7230]
ZHEN Lin [2182 2651]
QI Yu [0796 0056]

ORG: None

TITLE: "Zigong City"

SOURCE: Beijing DILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 6, Jun 79 pp 7-9

ABSTRACT: Zigong city is located in the central south region of the Sichuan basin, famous for its salt producing wells. The Fuqi River, which is a tributary of the Yangzi, flows through the middle of the city and is the route through which the salt is transported out of the city. The Chengyu Railway also passes through the city. Today, the city has four districts and one county, boasting a total population of 1.5 million. The history of the city and its salt industry are described. Since 1958, a modern chemical engineering industry, utilizing the city's natural resources of salt and natural gas, has been developing very rapidly, counting carbon black among its more than forty products. During the great cultural revolution, machinery, chemical fertilizer, electronics, etc. were also made a part of the booming industrial city to cause it to be no long a salt capital of the country. A map of the city and two photos are included.

AUTHOR: YANG Junping [2799 0971 1627]

ORG: None

TITLE: "Caohai [Grass Sea] of the Qianxi Plateau"

SOURCE: Beijing DILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 6, Jun 79 pp 12-13

ABSTRACT: The Wumeng Mountain region of the western part of Guizhou Province is traditionally called Qian-[an alias of Guizhou]xi Plateau. The elevation of the region is mostly above 2,000 m, but among the undulated hills, there are many crystal-clear lakes [called Haizi], the Grass-sea [Caohai] is one of these, located to the west of Weining City. This lake is 45 km^2 in area and the average water depth is 2 m. The county history describes the area as originally a vast plain, which became a lake during and after the rains in Dauguang 27th Year [1848]. Today, the lake shore, varying from 10 to 15 m in width is flat, with thick and fertile soil while the water is full of fishes. In 1970, through the blind interference of LIN Biao and the gang of four, ditches were dug in the Grass-sea to drain the water to cause its area to shrink. The drained lowland is too soggy for agriculture while the marine resources has suffered a great loss. The author suggests that the original area of the lake should be restored.

AUTHOR: ZHENG Benxing [6774 2609 5281]

ORG: None

TITLE: "A Survey of Glaciers in the Southeastern Part of Xizang [Tibet]"

SOURCE: Beijing DILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 7, Jul 79 pp 3-5

ABSTRACT: The glaciers in China may be divided into two types: Those developing on a high terrain, under a continental climate of low temperature and scant rainfall; those developing in a deep alpine valley under an oceanic climate of high temperature and rich rainfall. Glaciers of Qilian Mountains, Tianshan Mountains, and the northern slopes of Zhumulangma Mountain belong to the former, which have been extensively studied in the past. The latter have been studied very little. The characteristics of these oceanic glaciers and the boundary between the continental and the oceanic glaciers are the subject matter of this survey. For the trip, the author and colleagues flew to Lhasa on 16 May 1975 to begin the survey which was to last several years. Aside from reporting the scenes observed, the paper also describes in relative detail one of the major oceanic glaciers, the Ruoguo Glacier. A map depicting the distribution of glaciers in the southeastern part of the Xizang Plateau and another depicting the Ruoguo Glacier are included.

AUTHOR: WANG Xingge [3769 5281 7041]

ORG: None

TITLE: "Xuchang Tobacco"

SOURCE: Beijing DILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 7, Jul 79 pp 9-10

ABSTRACT: Tobacco is one of the major economic crops in Henan Province while the tobacco acreage of Xuchang District amounts to 2/3-4/5 of the province. Aside from the city which is administered by the provincial government, the district also includes 14 additional counties and municipalities. Xuchang's tobacco culture dates back to late Ming Dynasty. At first, it was all Chinese native sun-dried tobacco. Between 1915 and 1917, Western tobacco was introduced by the British American Tobacco Company. In 1977, the tobacco acreage was 1.4 million mou, 11 times that of 1950, and the total yield was four million dan. The natural conditions of the district, very suited for tobacco, are described. There is a map depicting the distribution of tobacco acreage in the district. Each dot on the map represents 3,000 dan of tobacco leaves.

AUTHOR: FA Nailiang [3127 0035 0081]

ORG: None

TITLE: "General Condition of Geographical Distribution of Major Malignant Tumors in China"

SOURCE: Beijing CILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 7, Jul 79 pp 26-27

ABSTRACT: A survey was carried out by Chinese scientists and related persons to study the geographical distribution of malignant tumors in China. Close to one million persons joined the survey work to compile and publish the Atlas of Malignant Tumors in the People's Republic of China. Based upon the data in the atlas, this paper reports the geographical distribution of stomach cancer, esophageal cancer, liver cancer, lung cancer, intestinal cancer, leukemia, rhinopharyngeal carcinoma, cancer of the uterine cervix, breast cancer, and the incidence and death of carcinomas of all parts of the body. Factors of the environment, the eating habit, and the sanitary condition which may possibly be related to a concentration of one of these diseases in a particular locality are discussed.

6168
CSO: 4009

AUTHOR: LIU Changan [0491 7022 1344]
DAN Jicai [0830 7139 1752]

ORG: Both of Kirin Provincial Institute of Geology

TITLE: "About the Principal Characteristics of Paleoplate Tectonics Along Old Sea Belt of Mongolian Oxots"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 pp 1-13

ABSTRACT: Between the Sino-Korean paraplatform and the Siberian platform, there is a vast and complex geosyncline, traditionally called the Mongolia-Oxots marine fold belt, famous for its rich mineral resources. This is the Mongolian Arc in geotectonics, believed to extend southward with the Siberian platform as its nucleus. This belief originated in the Soviet Union. Following the rise of the theory of plate tectonics, the existence of ophiolite in Inner Mongolia and the northern part of the Northeast Provinces has been noticed. In the process of learning plate tectonics, combined with an analysis of regional data, the authors have come to believe that it is more suitable to interpret the geotectonic development and evolvement of that region with the basic model of plate structure. An attempt of such an interpretation is presented in the paper.

AUTHOR: FENG Benzhi [7458 2609 2535]
LIU Zhansheng [0491 0594 5116]
LIU Penge [0491 7720 7725]

ORG: None

TITLE: "Preliminary Discussion of Island Arc type Ophiolite of the Mian-Liao-Ning Trilateral Belt in South Qinling Mountains"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 pp 14-28

ABSTRACT: Judging from the ophiolite and its tectonic position of the South Shaanxi triangle, it was an ancient volcanic island arc during the Sinian Period. Its formation and development took more than six hundred million years. Since then, many reconstructions have occurred to increase its complexity. During its early developmental stage, deposits related to the ophiolite may include iron, copper, gold, manganese, and pyrite; in the late stage, they may include nickel chromium, platinum, cobalt, vanadium, and titanium. After the ophiolite was reconstructed, asbestos may also be formed, as well as other genetic types of iron, copper, and gold. The authors derived the above conclusion from studies of the geological condition of the triangle, the petrography, petrochemistry, and metamorphic actions of the ophiolite, and the tectonic location and developmental history of trilateral belt. The evidences are reported.

AUTHOR: ZHAO Dongfu [6392 2639 3940]

ORG: None

TITLE: "A Type of Middle Ordovician Carbonatites and Analysis of Their Sedimentary Environment in Han-Xing Area"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 pp 29-36

ABSTRACT: The Middle Ordovician strata of the Han-Xing area is composed mainly of carbonatites, which have close spatial relationship with the Han-Xing type iron ore. Previous studies on the carbonatites placed emphasis on their stratigraphic location and their marine phase genesis has been commonly believed.. The author is of the opinion that they belong to the evaporation type, having obvious characteristics of a littoral environment. Tidal sediments occupy a major portion. The sedimentary action is not the shallow sea but the shore environment. Evidence for this conclusion is reported.

AUTHOR: None

ORG: None

TITLE: "English Geologists Visited Changchun Geological Institute"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 p 36

ABSTRACT: The chairman and five members of the British Institute of Geology paid a visit at the Changchun Geological Institute 8-10 April 1979. Aside from observation, the group also delivered speeches on hydrological and engineering geology, subterranean heat, and the technique of isotope determination.One of the group spoke of the method of making a hydro-geological map of England and the condition of water resources in London. The engineering structure, which has prevented a backup of sea water and guaranteed the city's water supply, was described. Drilling of most areas of England has produced dry heat without water. A technique , adopted to inject cold water into the drill hole, let it circulate, and withdraw hot water in another hole for power generation was also explained. The experience of rubidium-strontium dating of the Indochinese granite of Malaysia and its comparison with results of the potassium argon dating were also related.

AUTHOR: YANG Tianxing [2799 1131 5887]

ORG: None

TITLE: "Investigation of a Computation Formula for the Unstable Variable Flow Volume of a Circular Mining District in a System of Across-Doublelayers"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 pp 37-47

ABSTRACT: This paper studies the general equation for computing the gradient flow volume of a circular mining district in a secondary overflow system. The application of the formula of M.S. Man-shi-shi [transliteration] for no-overflow supplementation is thus expanded. The equation obtained is simplified to produce an asymptotic equation for computing a relatively extended period. A general equation for computing the volume of overflow supplement is finally obtained.

AUTHOR: None

ORG: None

TITLE: "A Delegation of Geologist From West Germany Paid a Visit at the Changchun Geological Institute and Delivered Scientific Reports"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 p 47

ABSTRACT: From 28 to 30 April 1979, the chairman and three other members of the West German Academy of Geology and Raw Materials came to the Changchun Geological Institute for a visit. Geologists of the group delivered papers on "A Principle of Evaluating Mineral Resources From an Economical Viewpoint," Genesis of Scheelite Metasomatite (Contact Rock) in Northern Brazil," "A Combined Geological, Mineral, and Chemical Survey of Brazil," "Chemical Prospecting Method of the West German Geological and Raw Material Academy." The extensive application of x-ray fluorescent spectroscopy and atomic absorption spectroscopic analysis of samples were explained. They emphasized the fact that a high value of a single element is not as reliable as the average value.

AUTHOR: CHANG Heming [0788 7729 7686]

ORG: None

TITLE: "Concerning the Theory of Determination of the Numeral Detector"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 pp 48-52, 13

ABSTRACT: The appearance of numeral [digital] seismographs has offered a good prospect to have ideal instrument for earthquake investigation. Although the technical indices are much higher than the analog magnetic seismographs, further improvements are still desired. One of these is to reduce the distortion level of the numeral detector. In the process of analyzing the distortion level, just as analyzing circuits, the spring, damper, etc. are regarded as ideal linear components, which, under a given condition, does not affect the substance of the discussion. This paper emphasizes the theoretical basis in the measurement of error variation of a given numeral detector. This error is also called nonlinear distortion,i.e. the frequency multiplication action produced at the output terminal when the input terminal is excited by a single frequency sine wave signal.

AUTHOR: DENG Benrang [6772 2609 6245]

ORG: None

TITLE: "On the Potential Distribution in A Nonhomogeneous Medium as Conductivity $\sigma = (\sigma_0 + \sigma_1 z)^{\alpha} e^{\beta z}$ $(\alpha > 0)$ Varying With the Depth"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 pp 53-61

ABSTRACT: The problem of distribution of direct current potential on the boundary surface of continuous half space is one of the basic problems of electrical prospecting. The problem is relatively difficult to express in a general analytic form, but it is still possible to seek its resolution under various special conditions. The purpose of this paper is to resolve the problem of potential distribution in a single layer medium when conductivity is in a $\sigma = (\sigma_0 + \sigma_1 z)^{\alpha} e^{\beta z}$ $(\alpha > 0)$ variation with the depth. Combined with actual situations, two types of observed resistivity functions are given. The result is correlated with works of other scientists on the subject.

AUTHOR: FU Zezhou [0265 3419 0719]

ORG: None

TITLE: "An Approach to Computing Methods of Single-well Unstable Yield of Unsteady System of Recharge"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 pp 62-68, 53

ABSTRACT: In recent years, there have been some discussions in China and abroad on methods of computing the overflow supplement, but in most cases the water reserve of layers above and below the major water containing layer is considered to be zero or sufficiently small to be ignored. In great many of real situations, however, the layers above and below are of semi-permeable nature. Although the permeability is low, it often amounts to a great deal in the total water to be withdrawn. The problem has been studied by other scientists, but none of them have discussed the method of computing the variable quantity of water to be withdrawn from a single well due to multi-layer overflow supplement. This paper gives the unstable yield of a single well, simplified result of two yields, and an asymptotic equation, obtained by simplification of the complex general equation, for long term or short term applications.

AUTHOR: SHANG Ling [1424 3249]

ORG: None

TITLE: "Application of Anisotropy Rotation in the Identification of Opaque Minerals"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEYUAN [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 pp 69-79

ABSTRACT: Among reflecting microscopic studies of opaque minerals, the study of the optic characteristics of minerals under orthogonal polarization had been deficient, primarily due to the lack of optical data. It was not until the past decade that theoretical bases were provided for the determination of various optical properties of minerals under orthogonal polarization. As a part of the regular department of the journal discussing new techniques and methods, this paper introduces the technique and application for determining the angle of anisotropic rotation and chromatic dispersion of opaque minerals.

AUTHOR: LIN Yingxi [2651 5391 6932]

ORG: None

TITLE: "The Ninth International Conference of Carboniferous Stratigraphy and Geology Held in the United States"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 p 79

ABSTRACT: The Ninth International Conference of Carboniferous Stratigraphy and Geology was held from 10 May to 2 June 1979 in the United States. Nearly one thousand delegates representing more than thirty countries attended. The opening ceremony was held in the auditorium of the State Department in Washington D.C. This was regarded as an important occasion in China and a fifteen member delegation, headed by the chairman of Chinese Academy of Geology, MENG Jisheng [1322 4949 5116] were dispatched to participate. The Chinese delegation delivered twelve papers which were well received by the other participants. While in the United States, the Chinese delegates visited the national Geological Survey headquarters, the Museum of Natural History of the Smithsonian Institution, and geological organizations in Illinois, Colorado, etc.

AUTHOR: MIAO Yantian [5379 1693 3944]
XIAN Jiaquan [0752 0857 2164]

ORG: None

TITLE: "Design of Plug Combination Unit for the Sample of Zonal Ionic Source of ZhT-1301 Type Mass Spectrometer"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 pp 80-88

ABSTRACT: At present, the majority of Chinese isotope laboratories use the Soviet design (Zht-1305 made in the Soviet Union) spectrometer, the structure of which is complicated. It requires precision work procedure and the cost is high. Its designing is not completely reasonable and its precision and sensitivity are not sufficiently high. For this reason, the authors introduced new techniques of degassing and designed a plug combination unit to improve the instrument. The theory and structure of the design are described.

AUTHOR: ZHAO Xicheng [6392 1585 3413]
LIN Erwei [2651 1422 3634]

ORG: None

TITLE: "Analysis Method of Pneumato-Hydratogenetic Inclusion in Minerals"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 pp 89-92

ABSTRACT: The technique of temperature determination using gaseous-liquid inclusions in minerals has had a history of many years, but research of this technique progressed very slowly. This is due to the fact that the inclusion is generally too small in volume to cause direct testing difficult while sample taking is extremely difficult without special equipment. With the development of the technique of trace element analysis, the work of testing the composition of the inclusive body has improved, however. Using a certain quartz deposit as an example, the authors experimented with the method of analyzing the composition of the inclusions. Results of the experiment are reported.

AUTHOR: None

ORG: None

TITLE: "A New Drilling Tool Created in China--Fluid Pressure Jet Impact Rotating Drill Successfully Made"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 p 92

ABSTRACT: With the cooperation and support of related organizations, the Prospecting Work Teaching and Research Office of Changchun Geological Institute and the Tieling Geological Brigade of Liaoning Provincial Bureau of Geology, after eight years of research, designing, repeated experimentation, and manufacturing, have recently succeeded in making the tool, for which the state's Bureau of Geology recently called a certification conference in Changchun. The Conference has resolved that the tool, from its theory to its practice, is a success. Its properties have been proved superior by more than twenty-four thousand m drilling production. The Conference has compiled a technical certification booklet for the tool, which will be manufactured in quantity by Shenyang Prospecting and Mining Plant within the coming year.

AUTHOR: None

ORG: None

TITLE: "Successful Research and Manufacture of WZD-01 Double Variation Refractometer"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 p 92

ABSTRACT: The Central Laboratory of the Changchun Geological Institute, the Changchun Academy of Optical Instruments, and the Kirin Provincial Huijiang Optical Instrument Plant have jointly succeeded in making the WZD-01 multiple use double variation refractometer. This is a Chinese creation. There have not been similar products in foreign countries. This instrument provides a powerful means to determine the index of refraction of ore crystals and liquids. At the recently called certification conference, the more than forty delegates representing thirty geological, metallurgical, mechanical, and scientific research organizations of the nation unanimously agreed that the instrument has reached the advanced standard of this country and abroad.

AUTHOR: ZHANG Busheng [1728 2975 0581]

ORG: None

TITLE: "Experience in Application of Y-2 Type X-ray Radiometer Made in China"

SOURCE: Chungchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 pp 93-97

ABSTRACT: At present, the Y-3 x-ray radiometers made in China are being extensively used in geological departments and organizations. This paper attempts to discuss the characteristics of this instrument, and problems of its regulation and adjustment and the elimination of malfunctioning for the reference of other users. Readers are invited to correct and amend the author's opinions here presented.

AUTHOR: None

ORG: The Editorial Office,of CHANGCHUN DIZHI XUEYUAN XUEBAO

TITLE: "To Our Readers"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 p 97

ABSTRACT: Beginning with the No 4 issue of 1978, the publication of this journal has often been delayed. The editors regreted this phenomenon and are seeking to change it with the concern and support of related supervisors. To commemorate the thirtieth anniversary of the nation and the twenty-seventh anniversary of the birth of the institute, a special edition is being planned. This journal aims to be a nationwide publication and welcomes manuscripts of general interest in geology. The papers should be clear and precise, between 7000 and 12,000 characters in length. Drawings and photos should be in a specified scale. There should not be more than fifteen publications in the references and foreign titles, etc. should be typed. A letter of recommendation or comment from the organization to which the author is affiliated is expected. When the manuscript is accepted and published, an appropriate reward will be paid. The office reserves the right of editing all incoming manuscripts before publication, however.

AUTHOR: ZHANG Zhensen [1728 2182 2773]

ORG: None

TITLE: "Preliminary Investigation of Correction to Atomic Lamp as Background"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 pp 98-105, 88

ABSTRACT: The background absoption in atomic absorption analysis is mainly caused by molecular absorption and light scattering. Background absorption within the ultraviolet-visible light spectra may occur to all specimens containing a large quantity of calcium, magnesium, sodium, potassium, iron, aluminum, etc. It is a pseudo-absorption to increase the light absorption value and hence to produce a positive error. The effect of background absorption on the determination of the element is, therefore, very great. This paper reports an experiment with the use of two hollow negative electrode lamps for atomic absorption analysis, with one of the two used for correcting the background absorption. Advantages of this method over methods using neon lamp and others are also discussed.

AUTHOR: MA Wanxian [7456 1238 0103]

ORG: None

TITLE: "Factors of Mineral Luminescence and Methods of Excitating Mineral Luminescense"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 pp 106-112

ABSTRACT: Studies on the phenomenon of luminescence of matter began as early as the eventh entury, but its extensive applications in biology, geology, black and white television, color television, photoelectrical source, etc. have only been forty years or so. In geology, the use of ore luminescence to prospect for scheelite, diamond, baryto-celestine, monazite and other rare earth ores is an economical and reliable method. Luminescence of ores is used not only as a means of identification and regionalization of minerals but also as a standard for investigating the genesis and geochemistry of ores. The three basic factors inducing luminescence of ores, the action of lanthanum elements in mineral luminescence, and forms of excitation for mineral luminescense are explained. The paper includes a table listing conditions of luminescense of various minerals of various regions of China under different forms of excitation method.

AUTHOR: ZOU Zurong [6760 4371 2837]

ORG: None

TITLE: "Geochemistry of Stable Isotope and Its Application in the Investigation of the Origin of Ore Deposits Lecture: No 2: Geochemistry of Lead Isotopes"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 pp 113-125

ABSTRACT: This second lecture on geochemistry of lead isotopes includes chapters on (1) Computation of ratios of U^{233}/Pb^{204}, Th^{232}/Pb^{204}, and Th/U; (2) Quadratic growth equation and quadratic isochronal line; (3) Lead development model according to the relationship among Pb^{206}, Pb^{207}, Pb^{208} proposed by R.S. Cannon; (4) Applications of lead isotope data in researches on ore genesis and in ore prospecting work.

AUTHOR: None

ORG: None

TITLE: "Visiting Scientists From Japan Delivered Scientific Reports"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 p 125

ABSTRACT: The vicechairman of International Joint Conference on Geology and a professor of the Science Department of Tokyo University of Japan Li-jian Chenxiong, the vicechairman of International Mineral Inclusion Association and a professor of the Department of Engineering of Tokyo University of Japan, Wunei Shoujiucheng, and Dr. Shiyuan Shunsan came to the institute for a visit 6-8 June 1979. They delivered some papers on A Brief History of Mining Black Mineral Deposits in Japan, An Attempt to Assess Mineral Resources, Current Conditions of Study on Liquid Inclusions in Japan, Granites of the Magnetite Series and Granites of the Hystatite Series and Their Co-mineralization Action, etc. Contents of these papers are very briefly mentioned.

AUTHOR: CHEN Manyun [7115 2581 0061]

ORG: None

TITLE: "Discovery of Lazulite in Eastern Qinling Mountains"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 pp 126-127

ABSTRACT: The name lazulite $(Mg\cdot Fe^{+2})Al_2(PO_4)_2(OH)_2$ originates in the Arabic language. Previously, it has been discovered in the United States, the Soviet Union, Madagascar Island, and Australia. This discovery is the first in China. The area of the discovery, the form of existence, and the spatial distribution characteristics of the lazulite are briefly described. There is also a table giving the x-ray powder crystallographic data of the east Qinling lazulite.

AUTHOR: ZHANG Qiusheng [1728 4428 3932]

ORG: None

TITLE: "General Condition of the International Ophiolite Conference in Cyprus"

SOURCE: Changchun CHANGCHUN DIZHI XUEYUAN XUEBAO [JOURNAL OF THE CHANGCHUN GEOLOGICAL INSTITUTE] in Chinese No 2, 79 pp 127-128

ABSTRACT: The International Ophiolite Conference opened on 1 April 1979 in Nicosia, the capital of Cyprus was the first of very specialized meetings called on the basis of Item 39 of the International Geological Comparison Plan (I.G.C.P.) More than three hundred delegates representing forty countries attended. Forty or so of the delegates are women. Some students also came with their teachers who were delegates. A total of 76 papers were read at the meetings. Ophiolite research is an important part of the plate tectonics hypothesis, but the term ophiolite does not denote a rock. It is rather a complex. Its Chinese translation is misleading. Geochemical research on ophiolite has provided valuable data for ore analyses as well as some important material foundations for tectonic analyses. These subjects and others discussed at the conference are briefly reported.

6168
CSO: 4009

AUTHOR: MENG Shaoxian [1322 4801 6343]

ORG: Shanghai Institute of Optics and Precision Instruments, CAS

TITLE: "The Physics of Superfast Processes"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 4, Apr 79 pp 1-5

ABSTRACT: The study of superfast processes in molecules has received great impetus from the development of high-speed pulsed lasers. Most commonly used are neodymium glass, neodymium YAG and ruby lasers. An essential factor has been the development of mode locking technology, which produces faster pulses. Also of importance is Q switching, accomplished with saturable dyes and Kerr cells, and Schlieren photography. Among processes studies by the technique are: photosynthesis, genetic processes, visual processes and hemoglobin; phosphorescence, vibration relaxation and other chemical processes; and aspects of solid-state physics, plasmas, electronics and laser engineering.

Manuscript received 30 June 1978.

AUTHOR: SHENG Jianing [4141 1367 1337]

ORG: Peking Institute of Dynamics, CAS

TITLE: "Nozzle Calculations for High Speed Flow Lasers"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 4, Apr 79 pp 6-11

ABSTRACT: The nozzle is a critical element in gasdynamic, chemical and other lasers, and accordingly a good basis for flow calculations for use in their design is important. Required characteristics are small dimensions, rapid expansion, uniform flow and precisely-defined form lines. Calculated form line coordinates are presented for $K = 1.4$ (specific heat) and $M_E = 4.5$ (outlet Mach number) for an acute-angled nozzle. These give the highest expansion rates without creation of a back-pressure gradient and with uniform flow.

Manuscript received 12 June 1978.

AUTHORS: GAN Fixu [1626 4395 3588]
LIN Fengying [2651 7364 5391]

ORG: Both of Shanghai Institute of Optics and Precision Instuments, CAS

TITLE: "Nonlinear Refractive Index of Glass and Methods of Calculating It"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 4, Apr 79 pp 12-16, 55

ABSTRACT: Nonlinear optics, including such phenomena as harmonic generation, parametric oscillation, stimulated scattering, multiphoton absorption and self-focusing, has become important in laser engineering. The nonlinear refractive index n_2 depends primarily on the third-order polarization tensor. A formula for calculation based on the ultraviolet resonance absorption band and various color scattering parameters is developed and compared with observed values, concentrating on those for classes based on fluorides and oxides.

AUTHOR: FANG Hongye [2455 3163 3525]

ORG: Shanghai Institute of Optics and Precision Instruments, CAS

TITLE: "Analysis of a Right-Angled Astigmatic Prism Resonant Cavity"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 4, Apr 79 pp 17-22

ABSTRACT: Self focusing poses a breakdown threat in laser materials; use of an elliptical beam promises an increase of a factor of 100 in the breakdown threshold of the medium. A matrix method for calculating the beam characteristics in such a case is presented and analyzed, and a graph of beam stability drawn up on the basis of the results.

Manuscript received 21 February 1978.

AUTHOR: Flowing Gas Laser Group, Institute of Dynamics, CAS

ORG: as above

TITLE: "A closed-Cycle Transversely-Excited CO_2 Laser"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 4, Apr 79 pp 23-26

ABSTRACT: In the experimental apparatus described, the working gas was heated by an electrical discharge, cooled in a heat exchanger and recycled into the laser cavity by a blower. The cavity size was 5 x 28 cm, the flow rate about 25 m/sec, the mass flow about 1,260 m^3/hr, and the rate of heat exchange 50 kcal/hr. A maximum potential difference of 10 kV was reached, with a maximum current of 10 A. The greatest output power was achieved at a pressure of 40 Torr and amounted to 194 W, with an efficiency of 5.2%.

Manuscript received 17 July 1978.

AUTHORS: LOU Quhong [2869 4388 3163]
HE Dijia [3109 6611]
YU Shusheng [0060 3412 3932]
ZHU Fulin [2612 4395 2651]

ORG: Shanghai Institute of Optics and Precision Instruments, CAS

TITLE: "An Ultraviolet Preionized CO_2 TEA Laser Amplifier"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 4, Apr 79 pp 27-31

ABSTRACT: In the apparatus described, the circuit for the spark discharge array was integrated with that for the main laser discharge, in order to make it possible to use a single power source. It was found that the main discharge input power increased linearly with the capacitance in the preionization discharge circuit. It was found that a time delay of 0.8-1.2 seconds gave the most complete glow discharge at a pressure of 700 Torr. With an input power of 260 J/liter, the small-signal gain was 38%/cm.

Manuscript received 10 April 1978.

AUTHORS: ZHANG Qixiang [1728 4860 7449]
YU Zuhe [0205 4371 0735]
WANG Tingyuan [3769 1656 7687]
ZHANG Zhiguo [1728 3112 0948]
TANG Xiao [3282 2556]

ORG: Peking Institute of Physics, CAS

TITLE: "A Nitrogen Molecular Laser Excited by a Parallel-Plate Transmission Line"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 4, Apr 79 pp 32-34

ABSTRACT: A parallel-plate transmission line was used to excite a transverse discharge in nitrogen, producing a peak output power of 1 MW with a repetition frequency of 50 Hz. It was found that at 130 Torr the individual pulse power increased much faster than voltage; as applied voltage was increased, the maximum output power was achieved at an increasing gas pressure. As pressure was increased, the pulse width decreased, finally leveling off at about 10 ns when the pressure reached 120 Torr.

Manuscript received 10 April 1978.

AUTHORS: ZHENG Cheng'en [6774 2110 1869]
HUO Yunzheng [7202 5366 3932]
BAO Zhixiang [0545 2535 7449]
YIN Zhijian [3009 5347 0494]

ORG: Shanghai Institute of Oqtics and Precision Instruments, CAS

TITLE: "Additive Gas Effects on the Output of an Electron Beam Controlled Discharge CO_2 Laser"

SOURCE: SHanghai JIGUANG [LASERS] in Chinese No 4, Apr 79 pp 35-39

ABSTRACT: It was found that addition of small quantities of hydrogen or water vapor to a CO_2-nitrogen or CO_2-nitrogen-hydrogen mixture in an electron-beam controlled laser increased output power at 10.6 microns. An increase in efficiency of 5.5% was achieved when hydrogen concentration was about 17 Torr in a total pressure of 760 Torr. For addition of water, it was found that optimum efficiency was achieved for CO_2 and nitrogen in a ratio of 1 : 4; the optimal E/P value was 5 V/cm-Torr. A theoretical discussion of the action of these gases on the relaxation process at CO_2 lasing levels is presented.

Manuscript received 10 April 1978.

AUTHORS: LIANG Peihui [2733 1014]
XIANG Cheng [7309 6134]
LI Shengshi [2621 4939 1709]

ORG: None

TITLE: "The Relationship Between Time Stability and Longitudinal Mode Structure of a Q-Switched Dye Laser Output"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 4, Apr 79 pp 40-43

ANSTRACT: Use of a saturable dye shutter for Q switching in lasers is a simple and effective process which has found wide experimental application. Generally the selective absorption characteristics of the dye assure that a single sharp peak output will be only a single mode--the output is much more precise that with a rotating mirror. But the time stability of these dye shutters is not good. Use of two-pulse discharge stimulation improved time stability but decreases coherence, allowing the second or third horizontal modes to pass through. A mathematical analysis of the phenomenon is presented, resulting in an uncertainty equation that shows the interdependence of spectral sharpness and shutter speed.

Manuscript received 10 April 1978.

AUTHORS: ZHANG Peimin [1728 1014 2651]
ZHANG Lianfang [1728 6647 5364]

ORG: Qinghua University

TITLE: "Loss Measurement and Its Application to the Cementing of a Mirror in an Intracavity Tube"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 4, Apr 79 pp 44-46, 61

ABSTRACT: Controlling losses is an important factor in improving the efficiency and operating characteristics of lasers. Present methods of checking reflector mirror cementi[illegible] not give an adequate control of losses. By the method proposed in this [illegible]pected losses and laser efficiency can be found even before the laser [illegible]s evacuated. A gaussian beam from a frequency-tunes lased is passed in[illegible]he laser cavity to be tested, which acts as a spherical Fabry-Perot etalon. Its transmitted light is allowed to fall on a photodetector and the photodetector output is dent to an oscilloscope, the other input of which is from a sawtooth wave generator which is also used to control the output of the standard laser. The results of test determinations during mirror cementing are described.

Manuscript received 17 August 1978.

AUTHORS: LIANG Xiangchun [2733 0686 2504]
WANG Ruihua [3769 3843 5478]

ORG: Shanghai Institute of Optics and Precision Mechanics, CAS

TITLE: "A Single Plane Plate Transverse Shear Interferometer and its Applications"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 4, Apr 79 pp 47-51

ABSTRACT: The principle of the transverse shear interferometer was enunciated in 1947, but it was only in 1964, with the advent of the laser, that Murty was able to construct a truly effective device. The present article describes the construction of such a device following Murty's technique and using a helium-neon laser. Application of the interferometer to test the collimation of a laser beam, to test the curvature of a spherical wavefront and th determine image distortion and lens characteristics is described. The minimum error in finishing the surface of the plate is 1/20 of a wavelength on each side, which is adequate since an accuracy to within a quarter wavelength is sufficient.

Manuscript received 4 May 1978.

AUTHOR: ZHAO Guoqing [6392 0948 3237]

ORG: Harbin Scientific and Technical University

TITLE: "The Time Averaging Method and its Applications"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 4, Apr 79 pp 52-55

ABSTRACT: The time averaging method is a basic one in the making of holographic interference measurements. An approximate mathematical analysis of the process is given and the results of specific experiments carried out by the authors are described. Photographs made by the authors showing the vibration modes of a compressor blade and a membrane are presented.

Manuscript received 27 July 1978.

AUTHORS: ZHANG Xinchang [1728 2450 2490]
SUN Mengjia [1327 1322 0857]

ORG: Shanxi University

TITLE: "Continuously Adjustable Power Supply for a Folded CO_2 Laser"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 4, Apr 79 pp 56-61

ABSTRACT: THe requirements for folded laser power supplies are especially stringent. Stable operation of all sections of the laser and ability of vary the discharge current over a wide range and to operate at dofferent power levels are required. A circuit design meeting these requirements is presented and selection of the essential parameters, i.e. the voltage and limiting resistance of the main power supply, is discussed, along with design of the switching circuit.

Manuscript received 27 October 1978.

AUTHOR: None

ORG: None

TITLE: "Brief Communications"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 4, Apr 79 pp 62-64

ABSTRACT: The following applications of laser technology are discussed: treatment of children's pneumonia by laser irradiation of key acupuncture points (Pediatric Department, Changchun Railway Hospital); treatment of chronic ear infection by laser irradiation of ear acupuncture points (Kirin People's Hospital); acupuncture anesthesia by laser irradiation (Shanxi Medical Institute); treatment of constipation by acupuncture point irradiation (People's Hospital No 1, Zhaoqing [5128 1987] District, Guangdong); a general comparison of laser radiation and acupuncture needle treatment of the acupuncture points (Taian]1132 1344] District Hospital, Shandong); and a preliminary investigation of the mechanism of "laser probe" action on the acupuncture points (Nanling [0589 1545] Laser Instrument Plant, Changchun).

AUTHOR: CHE Eyun [7115 6948 0061]

ORG: Xiangyang [0686 7122] National Instrument Plant

TITLE: "Symposium on Laser Devices Held by Laser Information Service of Fifth Ministry of Machine Building"

SOURCE: Shanghai JUGUANG [LASERS] in Chinese No 4, Apr 79 p 34

ABSTRACT: The Laser Information Service of the Fifth Ministry of Machine Building held a Laser Technology Information Exchange Comference in Idu [1355 6757], Hubei. Some 105 reports and communications were received; in addition an exhibit of laser technoligy was held. Specialized sessions dealt with helium-neon lasers, CO_2 laser service life, methods of increasing power and stability, miniaturization techniques, solid state laser optical pumping and power supplies, Q switching, resonance chamber technology, developments in YAG devices and nonlinear optics.

AUTHOR: None

ORG: None

TITLE: "Model B Laser Calorimeter and its Calibrating System"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 4, 1979 back cover

ABSTRACT: Photographs of the model B laser calorimeter and its calibrating system, developed by the China Institute of Metrology, are presented. Photos: 1. the neodymium glass laser energy calibrating unit; 2. the electrical calibration system; 3. the model B laser calorimeter.

AUTHOR: YIN Yuanzhao [1438 0337 2507]

ORG: Institute of Electronics, CAS

TITLE: "Free Electron Stimulated Emission of Radiation"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 5, May 79 pp 1-10

ABSTRACT: Free electron stimulated emission of radiation offers the possibility of constructing high power, continuously tunable lasers. Although the idea was first enunciated in the 50's, it was not until 1974 that the first millimeter wave device was constructed; an infrared device was constructed in 1977, stimulating considerable interest in this type of laser. The theory of free electron lasers is discussed in detail, beginning with the theoretical concept of the relativistic mirror and describing Compton emission and the Compton laser, stimulated bremsstrahlung and the bremsstrahlung laser, stimulated Raman scattering and the production of high energy microwaves, stimulated Cherenkov radiation and the Cherenkov laser, and stimulated electromagnetic impact excitation.

Manuscript received 24 October 1978.

•

AUTHORS: WU Cunkai [0702 1317 1956]
YANG Tianlong [2799 1131 7893]
SHU Haizhen [5289 3189 3791]
WANG Zhiying [3769 1807 5391]

ORG: Shanghai Institute of Optics and Precision Mechanics, CAS

TITLE: "The Principle of Reflective Wave Generation in Four-Wave mixing"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 5, May 79 pp 10-11, 9

ABSTRACT: The authors previously described the four-wave mixing effect using an organic dye medium based on nonlinear effects. It is now shown that this is a real time holographic process. Two interfering beams produce a strong spatial modulation in the medium. This produced changes in the spatial distribution of atoms in the ground and excited states, which in turn results in a change in refractive index and absorptivity. This produced an optical grating in the medium which is in effect a holographic record of the object wave. When a third wave is used as the reconstructing wave, the original object wave is reproduced. Transparent media such as CS_2, alcohol and water were used, but the effect was not as pronounced as when organic dyes (RHodamine 6G, Rhodamine B) were used. Neodymium glass and $CaF_2:Dy^{2+}$ crystals were also tested.

Manuscript received 11 October 1978.

AUTHORS: XU Zhizhan [1776 5267 1455]
CHEN Shisheng [7115 2514 0524]
OUYANG Bin [2962 7122 2430]
BI Wuji [3968 2477 1803]
Zhang Zhenmin [1728 2182 3046]
LI Anmin [2621 1344 3046]
LIN Lihuang [2651 4409 4552]
LIANG Xiangchun [2733 0686 2504]
HE Xingfa [0149 5281 3127]

ORG: Shanghai Institute of Optics and Precision Instruments, CAS

TITLE: "A 10-GW Neodymium Glass Laser"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 5, 1979 pp 12-16

ABSTRACT: HIgh power lasers are of great importance in the development of thermonuclear fusion: they can be used to compress the thermonuclear fuel to the high density required to initiate fusion. Features of Chinese high power laser currently under development are: use of electrooptical shutter Q switched unstable cavity resonator with a large modal volume and a small output scattering angle, narrow pulses produced by double Pockels cell electrooptical switches, and large-aperture multilevel traveling wave amplification. With a total pulse width of 8 ns, the single pulse energy reaches about 80 J, the pulse leading edgs lasts only about 1 ns, the scattering angle is only 0.5-1 milliradian, and the peak pulse power is abobe 1.5×10^{10} W. Detailed characteristics of some lasers in thsi class are presented. In 1973 irradiation of deuterium-containing polyolefin targets and lithium deuteride targets produced neutron emissions at a rate of 10^3/pulse (research done in China).

Manuscript received 4 January 1979.

AUTHORS: SHEN Hongyuan [3088 7703 0337]
HUANG Xiaolinag [7806 1420 6328]
ZHOU Yuping [0719 3768 1627]
HUANG Chenghui [7806 0701 8748]

ORG: Fujian Institute of Materials Structure, CAS

TITLE: "A Continuous Wave Nd + Cr: YAP Laser"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 5, May 79 pp 17-22

ABSTRACT: The heat produced in laser rods can cause axial thermal gradients resulting in thermal birefringence, thermoelasticity and heat swelling, causing a lens effect and decreasing the model volume. In polarizers it can result in depolarization losses, particularly in YAG rods. The use of naturally birefringent YAP materials may reduce these losses. A mathematical enelysis of depolarization losses along the b axis of Nd + Cr:YAP rods indicates that they are negligible. In an experiment using a planoconvex resonating cavity operating in the vicinity of the stable region, a power output of 32.8 W was produced in a rod measuring 5.3 mm in diameter by 54 mm long.

Manuscript received 16 September 1978.

AUTHORS: ZHANG Xinggui [1728 2622 1145]
XU Ziran [6079 5261 3544]
CHEN Nandou [7115 0589 2435]
ZHANG Zhifang [1728 1807 5364]

ORG: Nanking University

TITLE: "A Pulsed Regeberative Q-Switched YAG:Nd^{+3} Laser"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 5, May 79 pp 23-25

ABSTRACT: Lasers for measurement, precision machining and scientific research should have stable output. Ordinary electrooptically Q switched pulse lasers have a low repeatability, with peak power varying by 10 percent or more. By sing a regenerative method, the variation in peak power can be reduced to within 3 percent. The principle is similar to that of a dye Q switch. An optical fiber attached to the Pockels cell in the circuit samples the light intensity; it is connected to a control circuit which switches the voltage applied to the cell at the proper time, producing nearly identical pulses.

Manuscript received 9 November 1978.

AUTHOR: JIN Fengzhi [6855 6912 1013]

ORG: Integrated Optical Modulator Group, Jilin Institute of Physics, CAS

TITLE: "A Lithium Niobate-Tantalate SOlid Solution O+tical Waveguide"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 5, May 79 pp 26-30

ABSTRACT: Future optical fibers and integrated optical date processing systems will require broad-band high-speed low-loss waveguide materials. Lithium tantalate and lithium niobate have electrooptical and acoustooptic properties, are easy to make into high-quality waveguides with losses of less than 1 dB/cm, and are easy to process in integrated optical circuits and components. Metallic niobium was deposited on a lithium tantalate substrate in order to study the properties of a lithium tantalate-niobate solid solution waveguide. A table of measured mode refractive indices N_m is presented.

Manuscript received 13 October 1978.

AUTHORS: ZHOU Guosheng [0719 0948 3932]
WANG Chizhang [3769 2170 2973]

ORG: Department of Physics, Shanxi University

TITLE: "Testing a Laser Resonator by the OPtical Pumping Resonance Method"

SOURCE: Shanghai 'IGUANG [LASERS] in Chinese No 5, May 79 pp 31-33

ABSTRACT: The physical principles of a known method of testing a laser resonator cavity are explained. The method involces sending the light from a helium-neon laser into the cavity to be tested and determining its resonance qualities from the symmetry of the mode pattern of the transmitted light and the transmitted light peak value. Some concrete examples of the interpretation of mode patterns and transmission peaks are given.

Manuscript received 29 November 1978.

AUTHOR: SUN Yusheng [1327 3254 3932]

ORG: Shanghai Municipal Laser Engineering Institute

TITLE: "A Backscattering Laser Light Doppler Velocimeter"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 5, May 79 pp 34-38

ABSTRACT: The article describes a difference type backscattering laser light Doppler velocimeter and its design conception. The current backscatter measuring distance is 580 mm, the speed determination range is 0.5-25 m/sec, and the precision is 1-2 percent; velocity determination is one-dimensional. The device has advantages over other types of velocimeters, particularly in measuring chaotic flow, high-temperature flow and flow in a near-surface layer.

AUTHORS: WU Guangzhao [0702 0342 3564]
ZHANG Xiurong [1728 4423 2837]

ORG: Shanghai Institute of Optics and Precision Mechanics, CAS

TITLE: "Determination of Neodymium Ion Concentration in YAG:Nd^{3+} Crystals"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 5, May 79 pp 39-40, 38

ABSTRACT: The neodymium concentration is a critical feature of YAG:Nd^{3+} crystals for laser engineering use. Because the segregation index of neodymium in YAG is less than 1 and tends to vary during the process of crystal growth, a means of determining the neodymium concentration in specific samples is needed. A simple calculation gives the concentration in terms of the absorption coefficient; of various possible absorption lines , the one at 8690 Å is chosen. The results of tests carried out on samples of various neodymium YAG crystals are presented.

Manuscript received 10 April 1978.

AUTHORS: YU Yaojin [0205 3852 6855]
FAN Pinzhong [3058 0756 1813]
FANG Wuji [2455 2477 1803]

ORG: Shanghai Institute of Optics and Precision Mechanics, CAS

TITLE: Measurement of the Voltage Drop Between Electrodes in Pulsed Xenon Flash Lamps"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 5, May 79 pp 41-44, 16

ABSTRACT: The main determining factor of the emission capability of an electrode in a xenon flash lamp is its work function; but this is generally determined in a vacuum, and little work has been done on the relationship between the electrode potential in a gas atmosphere and the work function. A probe method was used to determine the voltage drop between the electrodes in five different types of flash lamps, so as to test the relationship between the two abovementioned factors. It was found that the potential drop between the electrodes is approximately proportional to the work function. The spatial extent of the electrode voltage drop region and the electric field strength were calculated and found to be in good agreement with actual figures.

Manuscript received 26 June 1978.

AUTHOR: LÜ Lindang [0712 2651 2455]

ORG: Anhui Institute of Optics and Precision Mechanics, CAS

TITLE: A Voltage Stabilized Pulse Power Supply For S!lid State Lasers"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 5, May 79 pp 45-50

ABSTRACT: The new power supply design is primarily for high power high repeatability solid state lasers. It uses a new principle for voltage stabilization: every time the resonance capacitor is charged, the voltage is sampled and a comparison made with a reference voltage, resulting in the emission of a signal which triggers a silicon sontrolled rectifier (SCR). After the SCR becomes conductive, its energy is bled off by a special resistor, and the voltage control switch stops charging the SCR, as a result of which the storage capacitor maintains a voltage corresponding to the reference voltage until it discharges. The circuit is simple, uses few components, and is light and compact. A mathematical enelysis of the circuit characteristics is presented.

Manuscript received 15 November 1978.

AUTHOR: LIN Fangzheng [2651 2455 2973]

ORG: None

TITLE: "The Quest for Improvement of the Static Extinction Ratio Tester"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 5, May 79 p 51

ABSTRACT: A recent article in JIGUANG described a new kind of static extinction ratio tester using the two-optical-circuit method. Unfortunately, it appears that a term has been left out in one of the equations, resulting in a discrepancy between the calculated and experimental values. An expression for this additional extinction term is calculated.

Manuscript received 24 November 1978.

AUTHORS: LIU Huangfeng [0491 6106 7364]
GAO Zhengyao [7559 2973 5069]
LIU Dajun [0491 2192 7786]

ORG: None

TITLE: "A Sealed-Off Double-Discharge Atmospheric He-N_2 Laser"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 5, May 79 pp 52, 50

ABSTRACT: The helium laser output at 3371 Å is a convenient coherent ultraliolet light source of wide application. Unfortunately, the requirement for a long discharge electrode and fast discharge make such lasers difficult to build, and the use of nitrogen at 10 Torr, generally flowing, makes the device cumbersome and complex to use. When a high pulse repetition rate is not required, the flow technique is unnecessary. The design presented here is a sealed design intended to obviate the above-mentioned shortcomings. In order to improve discharge uniformity and increase the working pressure range, corona preionization technology is used. The device works at atmospheric pressure and with a nitrogen-helium ratio of 7 : 1. The working voltage is 10 kV, and with a repitition rate of 2 Hz the single pulse energy is about 1 mJ.

AUTHOR: None

ORG: CAS Delegation to Inspect Laser Thermonuclear Fusion in Japan

TITLE: "Development and Current State of Laser Fusion Research in Japan"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 5, May 79 pp 53-57

ABSTRACT: Laser fusion research in Japan is not centralized, but is carried out by a number of organizations with financial support from the government. The Osaka University Laser Fusion Research Center was set up in 1972, but work has already been proceeding for a number of years. In 1969 the Gekko-I neodymium glass laser with a power of 10^{10} W was developed. Private corporations cooperating in the development work are the HOYA glass Company, Nikon, Nippon Electronic Corporation and Canon. In addition, the Nagoya University Institute of Plasma Physics, which is concentrating on other fusion approaches, is giving support to the laser fusion work. The Gekko-II, developed in 1975, is a two-beam system with a power of 1 GW. The Gekko-IV, developed between 1975 and 1977, reaches 4 GW (0.1 ns pulse). The Gekko-XII is currently under development by Nippon Electronics. Work on oscillators, rod type amplifiers, vacuum spatial wave filters and Faraday isolators is also described. The main development of laser glass for the project is by the HOYA Glass Company, which is also developing glass for Faraday elements and glass to eliminate spurious oscillation.

Manuscript received 29 February 1979.

AUTHOR: None

ORG: None

TITLE: "Rapid Communications"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 5, May 79 p 58

ABSTRACT: A Blumlein-type transverse discharge XeF laser output was studied using a 31W1I optical grating spectrometer. When teh input energy was increased the intensity of the various spectral lines increased without a change in their relative strengths; an increase in the reflectivity of the end mirror increased the number of spectral lines observed; as the gas pressure was decreased, the relative strength of spectral lines corresponding to high energy vibrational transitions increased. In experiments on Xenon fluoride, BCl_3, CCl_4 and $CHCl_3$ were used to prepare the xenon chloride. New spectral lines were pbserved in a laser using xenon and carbon tetrachloride or chloroform.

AUTHOR: ZHANG Zechun [1728 3419 4783]

ORG: SHanghai Institute of Optics and Precision Mechanics, CAS

TITLE: "Second Science Symposium Held by the Shanghai Institute of Optics and Precision Mechanics"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 5, May 79 p 59

ABSTRACT: The Second Science Symposium of the Shanghai Institute of Optics and Precision Mechanics was held on 27-31 march 1979. More than 100 laser specialists from 40 organizations were invited. Keynote speakers were LI Jiaming [2621 1367 2494] (Institute of Physics, CAS), LIU Demin [0491 1795 3046] (Shanghai Laser Seminar) and GAN Fuzi [1626 4395 3588] (Shanghai Institute of Optics and Precision Mechanics). The 282 papers received dealt with theoretical, practical and technical matters. An extremely broad list of subjects was covered, dealing with various types of laser engineering and related technology.

AUTHOR: None

ORG: Shanghai Municipal Institute of Laser Technology

TITLE: "Brief Communications"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 5, May 79 pp 60-62

ABSTRACT: Brief reports are presented on current developments, including: a copper vaporization laser; an adjustable pulse repetition frequency pulsed argon ion laser; parameters of 3250 A helium-cadmium laser radiation; compression of line width of pulsed dye laser radiation; multimode laser recording holography; use of 135 film for high-speed holography; image analysis of reflection volume holography; a new holographic interference technique; a modulator based on ADP 45° X (Y) slices; a lithium niobate modulator; optimal compensation of an integrated electrooptical modulator; use of a helium-neon laser beam to control lithium niobate srystal growth; preliminary analysis of the precision of a large-screen display; noncontact testing of the diameter of fine wire; and infrared laser nondestructive testing.

AUTHORS: CHEN Yungkang [7115 3057 1660]
WANG Yan [3769 3601]

ORG: Department of Modern Medicine, Central People's Hospital, Jinan City

TITLE: "Laser Treatment of Trigeminal Neuralgia"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 5, May 79 p 63

ABSTRACT: Satisfactory improvement in 6 out of 7 cases of trigeminal neuralgia was obtained by irradiation of various acupuncture points with radiation from a 4 mW helium-neon laser. Treatment consisted of sessions in which each acupuncture point was irradiated for 5-10 minutes. The interval between treatments was 3-5 days.

AUTHOR: None

ORG: Laser Laboratory, Ear Nose and Throat Department, Hospital No 2, Wuhan Medical Institute

TITLE "Treatment of a Case of Laryngeal Carcinoma with a CO_2 Laser"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 5, May 79 p 63

ABSTRACT: The patient has experienced throat dryness and difficulty in speaking for 5 months, He was found to have a pea-sized malignancy on the inside of the larynx. Radiation from a 70-watt CO_2 laser was used to excise the tumor, resulting in only slight loss of blood. The patient was able to take semisolid food the next day. He received radiation treatments 20 days later, and left the hospital after two months. Subsequent laryngoscopy revealed a whitish scar but good condition of the laryngeal membrane. Four months after the operation the patient was able to talk for periods of 1-3 hours without difficulty.

AUTHOR: None

ORG: None

TITLE: "The WJX-1 Laser Microspectrometer"

SOURCE: Shanghai JIGUANG [LASERS] in Chinese No 5, May 79 p 64

ABSTRACTS: Photographs of the WJX-1 laser microspectrometer and its neodymium glass laser unit, developed by the Hefei Industrial University and the Wuhu [5335/2477 3275] Optical Instrument Plant, are presented.

8480
CSO: 4009

AUTHOR: JIA Zhenxue [6328 2182 1331]
LIN Tongji [2651 0681 7535]

ORG: None

TITLE: "Transonic Flow in Hyperbolic Laval Nozzles"

SOURCE: Beijing LIXUE XUEBAO [ACTA MECHANICA SINICA] No 3, Jul 79 pp 199-208

TEXT OF ENGLISH ABSTRACT: Transonic flow in the throat region of hyperbolic Laval nozzles is analysed using the conformal curvilinear coordinate method. A solution to this type flow is given for the cases of different radii of wall curvature at the throat and different values of the ratio of the specific heats. The general behaviour of the transonic flow and Mach number distribution in the throat region are presented. This method gives fine accuracy. It can be applied in the designing of nozzles, especially, in the designing of aerodynamic laser nozzles.

The paper was received on 10 September 1977.

AUTHOR: ZHU Youlan [2612 1635 5695]
CHEN Bingmu [7115 3521 2606]
ZHANG Zuomin [1728 0155 3046]
ZHONG Xichang [6945 6932 2490]
TAN Boliang [6009 0130 5328]
ZHANG Guanquan [1728 7070 3123]

ORG: All of Computing Center, Chinese Academy of Sciences

TITLE: "The Numerical Calculation of the Supersonic Flow Around Combined Bodies"

SOURCE: Beijing LIXUE XUEBAO [ACTA MECHANICA SINICA] No 3, Jul 79 pp 209-218

TEXT OF ENGLISH ABSTRACT: In this paper we present several numerical solutions of inviscid flow around arbitrary bodies. These solutions are obtained by the "singularity separating" difference method developed by authors, and we see that the numerical results are generally quite good. The examples computed include: (1) the calculation of interaction between two shocks and between a shock and a contact discontinuity, (2) the automatic and precise determination of embedded shocks, (3) the calculation of entropy layers and (4) the computation of the flow fields about various combined bodies. The details of the numerical method and further numerical results may be found in the work [1].

[Continuation of LIXUE XUEBAO, No 3, Jul 79, pp 209-218]

The paper was received on 5 January 1978.

AUTHOR: LUO Zuiao [5012 4371 6670]

ORG: Shanghai Jiaotong University

TITLE: "On Axisymmetric Deformation of a Finite Hollow Cylinder"

SOURCE: Beijing LIXUE XUEBAO [ACTA MECHANICA SINICA] No 3, Jul 79 pp 219-228

TEXT OF ENGLISH ABSTRACT: In the present paper, problems on axisymmetric deformation of a finite hollow cylinder are investigated. Displacements and stresses in such a cylinder under general axisymmetric loads are formulated in forms of two infinite series--Fourier series and Fourier-Bessel series. Due to the orthogonality properties of the series, referring to any prescribed boundary conditions, the coefficient of each term in one series can always be expressed in a linear function of the coefficients of the other series. Final solution may thus be obtained from the solution of these simultaneous equations, and it becomes exact in the limit as more terms of the series are taken.

The paper treats, in particular, the end problems of finite hollow cylinders. To illustrate the method of solution, an example with practical interest is given in the paper. Numerical computations are made for some displacements

and stresses. The results are plotted in graphs and compared with those from approximate calculations often used in machine design. Appreciable discrepancies between them are found in this particular case. It should draw special attention to the designers.

The paper was received on 19 February 1978.

AUTHOR: MIAO Tiande [5379 1131 1795]
TANG Renji [3282 0117 1015]
ZHANG Jianguo [1728 1696 0948]

ORG: All of Lanzhou University

TITLE: "A Plastic Analysis for Forming Bent Tubes by Pushing Them Through a Horn-like Axle-tree"

SOURCE: Beijing LIXUE XUEBAO [ACTA MECHANICA SINICA] No 3, Jul 79 pp 229-239

TEXT OF ENGLISH ABSTRACT: The forming of bent tubes by the use of a horn-like axle-tree is one of the effective techniques in metal-forming processes. This paper deals with a mechanical model for the problem by grounding its usage on materials from various experiments.

Mathematically, we have formulated it as a typical "Goursat problem," and got a satisfactory solution, the results of which might contribute a foundation for the analysis of mechanism of forming bent tubes by pushing them through a horn-like axle-tree and other interesting theoretical problems.

The paper was received on 26 April 1978.

AUTHOR: CAI Haitao [5591 3189 3447]

ORG: Central South Institute of Mining and Metallurgy

TITLE: "First and Second Periodic Fundamental Problems of Semiinfinite Medium With Anisotropic Elasticity"

SOURCE: Beijing LIXUE XUEBAO [ACTA MECHANICA SINICA] No 3, Jul 79 pp 240-247

TEXT OF ENGLISH ABSTRACT: In this paper are given the solutions of the first and the second periodic fundamental problems of semi-infinite medium with anisotropic elasticity by means of the formulae of integrals with Hilbert Kernel. The stresses, the displacements and the boundary conditions are assumed to be periodic, and further, the stresses are assumed to be bounded at infinity. The solutions are expressed in closed forms. The case of orthogonal anisotropic elasticity with the anisotropic axes parallel to the coordinate axes is particularly exemplified.

The paper was received on 31 August 1977.

AUTHOR: LIU Zheming [0491 0772 2494]

ORG: None

TITLE: "Bimodal Two-stream Relaxation Distribution of Gas Molecules and Heat Conduction Between Two Parallel Plates"

SOURCE: Beijing LIXUE XUEBAO [ACTA MECHANICA SINICA] No 3, Jul 79 pp 248-259

TEXT OF ENGLISH ABSTRACT: Various influence factors of solid boundaries on discontinuties in the gas molecular distribution function are considered and a bimodal two-stream relaxing distribution is suggested. In applying it to the heat conduction problem between two parallel plates by Maxwell transport equation we obtained a closed solution. According to the theory suggested in this paper, in the linear case, the calculated heat transfer is close to that given by existing theory. In the nonlinear case (when the temperature ratio of two plates is equal to four), the difference between Willis precise numerical results and ours is less than 2.5%. This is an obvious improvement as compared with the Liu-Lees theory. Furthermore, temperature calculations demonstrate the existence of a Knudsen layer.

[Continuation of LIXUE XUEBAO, No 3, Jul 79, pp 248-259]

The paper was received on 17 June 1978.

AUTHOR: CHEN Zixiong [7115 0843 3574]

ORG: Institute of Mechanics, Chinese Academy of Sciences

TITLE: "Eigenvalues and Eigenfunctions of Unstable Resonators"

SOURCE: Beijing LIXUE XUEBAO [ACTA MECHANICA SINICA] No 3, Jul 79 pp 260-265

TEXT OF ENGLISH ABSTRACT: The existence of eigenvalues and eigenfunctions of an unstable resonator is demonstrated. The number of these eigenvalues or eigenfunctions is shown to be infinite and denumerable. We point out that the ε-approximate eigenvalues and the ε-approximate eigenfunctions of the unstable resonator suggested in reference [1] can not express the real losses and the real field distributions of it. The characteristics of mode selection in the unstable resonator with finite mirror sizes are pointed out.

The paper was received on 25 January 1978.

AUTHOR: QIAN Fuxin [6929 4395 2502]
XIAO Linkui [5618 2651 1145]
SHI Zhenping [4258 2182 1627]

ORG: Institute of Mechanics, Chinese Academy of Sciences

TITLE: "Compression Processes of Free Pistons After Nozzles Are Opened in a Hypersonic Gun Tunnel"

SOURCE: Beijing LIXUE XUEBAO [ACTA MECHANICA SINICA] No 3, Jul 79 pp 266-274

TEXT OF ENGLISH ABSTRACT: The report is concerned with compression processes of free pistons after the opening of nozzle in a hypersonic gun tunnel. The nozzle flow will start at the time when the primary shock running ahead of the piston reaches the diaphram at the entrance of the nozzle and the piston starts to decelerate at the time when the shock reflected from the nozzle strikes it. The momentum equation for the motion of the piston and the continuity equation of mass of the gas are derived respectively, and the finite-difference calculations are carried out by computers.

According to the results obtained, piston deceleration, overrush, rebound, oscillations, equillibrium running and peak pressure are discussed for various given initial conditions. It is shown that compression processes of free pistons after the opening of nozzle in a hypersonic gun tunnel are significantly different from those for a closed nozzle. The results are compared with those obtained with equilibrium technique based on closed nozzle and with some experimental data, and furnish important information for the operation of hypersonic gun tunnels.

[Continuation of LIXUE XUEBAO, No 3, Jul 79, pp 266-274]

The author wishes to express thanks to HE Longde [0149 7893 1795] for programming electronic computer. The paper was read at the First All-China Exciter Tube Convention sponsored by the China Mechanics Society. The paper was received on 21 November 1978.

AUTHOR: QIN Yuwen

ORG: Tianjin University

TITLE: "Application of Faraday's Effect in the Holographic Photoelasticity"

SOURCE: Beijing LIXUE XUEBAO [ACTA MECHANICA SINICA] No 3, Jul 79 pp 275-281

TEXT OF ENGLISH ABSTRACT: The basic principle of Faraday's effect on the separation of fringes in holographic photoelasticity, and a study and application of Faraday's light rotator are described in this paper. It is proposed that Faraday's light rotator can be used for the automation of photoelastic instrumentation for measuring isoclinics and the decimal orders of isochromatic fringes.

The paper was received on 26 December 1977.

AUTHOR: LI Dingkun [2621 1353 0981]

ORG: Fuzhou University

TITLE: "A Method of Solving Stability Problems for Thin Circular Cylindrical Shells"

SOURCE: Beijing LIXUE XUEBAO [ACTA MECHANICA SINICA] No 3, Jul 79 pp 282-286

ABSTRACT: For the stability problem of closed cylindrical shells acted on by uniform lateral external pressures, formerly researchers only derived solutions corresponding to simply supported boundary conditions or individual non-simply-supported boundary conditions. The paper proposes a solution, which can be adjusted to various boundary conditions. Presented are two equations to and the basic theory for the solution. For a result corresponding to several boundary conditions, the solutions are theoretically sound and feasible in practice. With a computer, adoption of this solution method can allow us to conveniently and accurately calculate the critical loads and the number of periodic waves under the various boundary conditions. The paper was received on 25 April 1978.

AUTHOR: WU Guochuan [0702 0948 6861]

ORG: Nanjing Aeronautical Institute

TITLE: "Prediction of Turbulent Boundary Layer Separation"

SOURCE: Beijing LIXUE XUEBAO [ACTA MECHANICA SINICA] No 3, Jul 79 pp 287-290

ABSTRACT: The analysis given in the paper states that from the rule of velocity variation in the main flow zone, whether or not separation occurs in the boundary layer can be predicted to some extent. This prediction can be the basis for designing a gas intake pipe with good flow condition and low pressure drop due to friction. Also, prediction here can prejudge the quality of the designed gas intake pipe. The necessary conditions derived in the paper for no separation of the turbulent boundary layer are actually not related to gas intake pipe parameters. Hence, this conclusion is not only adaptable to gas intake pipe, but also to turbulent motion in the device for pressure relief and in the blade array of gas pumps. The paper was received on 21 July 1978.

AUTHOR: HUANG Mingke [7806 2494 1870]

ORG: Nanjing Aeronautical Institute

TITLE: "Aerodynamic Interference of Wing-body-store Combinations"

SOURCE: Beijing LIXUE XUEBAO [ACTA MECHANICA SINICA] No 3, Jul 79 pp 291-293

ABSTRACT: From J. N. Nielsen's MISSILE AERODYNAMICS [published by McGraw-Hill Book Company, Inc. (1960)], the theory of long, slender bodies is important in the aerodynamic evaluation of aircraft. This paper considers long, slender wing-fuselage-store combinations. Both fuselage and store have circular cross sections. Based on the theory of long, slender bodies the lift force of a combination body in front of a lateral cross section is a function of the velocity and density of the incoming fluid. A Model X-2 computer was used to make calculations. The results are listed in a table. The paper was received on 1 November 1977.

AUTHOR: CHU Wuyang [5969 2976 2799]
XIAO Jimei [5618 4764 5019]
LIN Shi [2651 1395]

ORG: All of Beijing Iron and Steel Institute

TITLE: "Analysis of Surface Cracks"

SOURCE: Beijing LIXUE XUEBAO [ACTA MECHANICA SINICA] No 3, Jul 79 pp 294-297

ABSTRACT: This paper describes the rule of surface cracks formed by surface defects, the growth rate of surface cracks, and the change in appearance caused by surface cracks during the fatigue process. Five conclusions are stated: (1) crack formation during bending fatigue for surface semielliptical defects; (2) during bending fatigue, the growth rate of surface cracks differs from the growth rate of puncture cracks; (3) differences between growth rates of surface cracks and of puncture cracks for elongation fatigue; (4) situations occurring during bending fatigue; and (5) situation occurring during elongation fatigue. The paper was received on 4 June 1977.

AUTHOR: GUO Zhongheng [6753 0112 5899]

ORG: Beijing University

TITLE: "Stress Intensity Factor of Twisted Cylinder With Radiating Internal Cracks"

SOURCE: Beijing LIXUE XUEBAO [ACTA MECHANICA SINICA] No 3, Jul 79 pp 298-302

ABSTRACT: In INTERNATIONAL JOURNAL OF ENGINEERING SCIENCE, 10 (1972), pp 801-812 by J. Tweed and D. P. Rooke, by using the superimposition method of sine series solution and the Mellin integration solution, the twisting of cylinder containing external cracks is discussed. The paper analyzes a twisted cylinder with radiating internal cracks. After transformation of the π/n sector region into a semicircle by using a perpendicularity transformation, the superimposition method is used. By successively solving three sectors of the integral equations and Cauchy kernel odd integral equation, the problem then ends up as a continuous kernel of a Fredholm's equation of the second kind to be mathematically solved. Thus, we derive the equation expressing the anti-twisting rigidity and stress intensity factors. The paper was received on 24 October 1977.

10424
CSO: 4009

END

END OF FICHE

DATE FILMED

9 OCT 79

WB